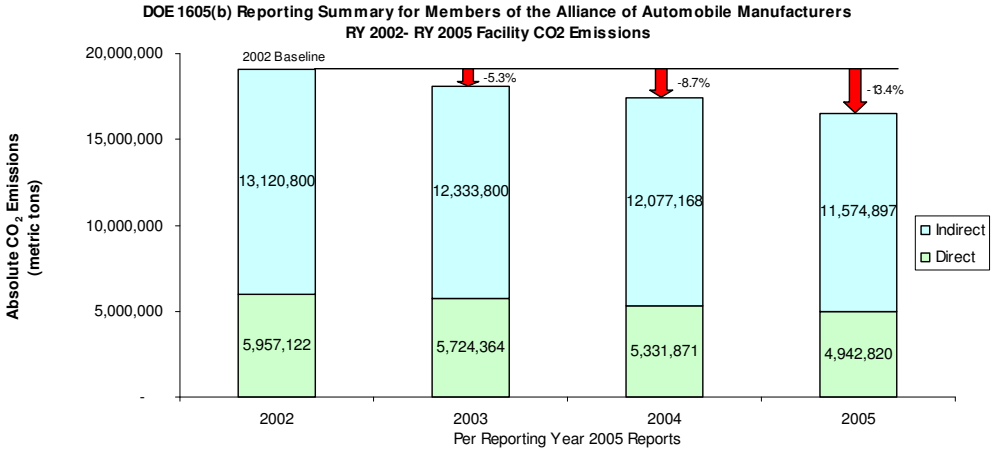
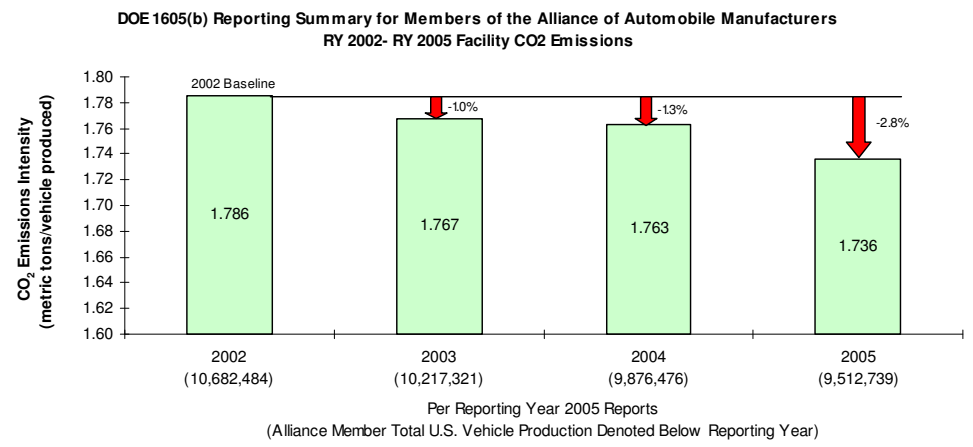
Alliance of Automobile Manufacturers

Highlights	• Members of the Alliance of Automobile Manufacturers have committed to a goal to reduce Greenhouse Gas (GHG) emissions intensity by 10% from their U.S. manufacturing facilities (CO_2/number of vehicles produced) by 2012 from 2002. • In 2005, Alliance members reduced absolute CO_2 emissions by 13.4% from 2002 levels. GHG emissions intensity (CO_2/number of vehicles produced) also decreased, by 2.8% in 2005 from 2002. These reductions contribute to the President's GHG intensity reduction goal by improving energy efficiency within the industry. • Alliance members engage in a number of public/private partnerships that focus on cost effective energy efficiency and energy management projects. They have been the recipients of a variety of recent national and local awards. Member companies are also working individually at their facilities to reduce emissions, benefit the environment, and improve their energy and fuel use footprint.
Industry Sector and Participants	The Alliance of Automobile Manufacturers is a trade association of 9 car and light truck manufacturers including BMW Group, DaimlerChrysler, Ford Motor Company, General Motors, Mazda[1], Mitsubishi Motors, Porsche[2], Toyota and Volkswagen[2]. Combined, these companies account for more than 80 percent of U.S. vehicle sales. [1] Reporting covered by Ford Motor Company. [2] Does not own or operate U.S. manufacturing facilities.
Primary CV Commitment	Alliance member companies committed to a goal to achieve at least a 10% intensity reduction in GHG emissions from their U.S. automotive manufacturing facilities, based on U.S. vehicle production (CO_2/vehicles produced), by 2012 from a base year of 2002. The primary mechanisms that individual companies are implementing include energy management programs that encompass energy efficiency improvements to automobile and light duty truck manufacturing, buildings and process equipment (e.g., increasing efficiencies for lighting, heating and cooling), conserving energy, electricity, and fuel demand, making process improvements, and recycling materials and packaging. Progress may be affected by external factors such as weather, fuel availability, and significant production fluctuation.
Additional CV Commitments	• Alliance members agreed to make their progress public by annually reporting their energy use and GHG emissions and reductions to the U.S. Department of Energy (DOE) Voluntary Section 1605(b) GHG Registry. • The Alliance and its members are working in collaboration with the U.S. DOE, the U.S. Environmental Protection Agency (EPA), and other partners to implement activities which contribute to the President's goal of reducing the GHG intensity of the United States economy by 18% by the end of 2012.

Related Industry Programs	• Energy Star "*Industries in Focus"* Program:
	  • Alliance members participate in the **Auto Sector** activities under the Energy Star "Industries in Focus" Program, co-sponsored by EPA and DOE.
	  • In September of 2006, nine U.S. automobile assembly plants were the first recipients of the new "**Energy Star Plant Award"** in recognition of their energy-efficient operations that prevented GHG emissions. The energy performance scores for these plants were in the top 25 percent nationally. Only 8 facilities from all other manufacturing industries were recognized in the

	first year of the Energy Star Plant Award. • Automobile manufacturers coordinated with DOE, EPA and Lawrence Berkeley National Laboratory to develop the ***Energy Star Guide***, ***"Energy Efficiency Improvement and Cost Saving Opportunities for the Vehicle Assembly Industry,"*** which has become a program model. • Automobile manufacturers also helped develop the ***Energy Performance Indicator (EPI) Tool*** to facilitate the ability for facilities to benchmark their energy usage, GHG reduction planning, conservation activities, efficiency improvements, changes in operating practices, and employee awareness programs. • Alliance members have been consistent recipients of the Energy Star Industrial Awards (See web link below for recipients). • DOE Office of Energy Efficiency and Renewable Energy (EERE): • Alliance members participate in the Office of Industrial Technology (OIT) energy efficiency and technology training events on various energy applications (pumping, steam, process heating, etc.) and co-sponsored energy efficiency applications (i.e., Rebuild America Program). Members also take advantage of site auditing and technical expertise provided by DOE. • Various members also participate in the EPA Climate Leaders Program, Suppliers Partnership for the Environment (SP), and Landfill Methane Outreach Program (LMOP). • Forest preservation and reforestation activities are also ongoing.
Metrics Identified	The Alliance target is expressed as a 10% intensity reduction in GHG emissions from their U.S. automotive manufacturing facilities, based on U.S. vehicle production (CO_2/vehicles produced).
Measured Results to Date	These graphs show that for Alliance member company U. S. facilities, both absolute emissions and emissions per vehicle produced (emissions intensity) dropped in each year through 2005 compared with the baseline year of CY 2002, as reflected in member company reports to the DOE Section 1605(b) Voluntary GHG Registry as of December 2006. Reductions came as a result of each company's mix of energy, fuel use, and electricity use efficiency improvements, and operational and production changes. 



Company Projects and Activities (Success Stories)

Each member is focusing on those projects that are the most efficient and economical to implement, based on company-specific considerations. The following is a subset of those projects:

BMW initiated a project to use methane gas to power four onsite turbines and "cogenerate" electricity and hot water for the manufacturing plant in South Carolina. Annually, this project reduces CO_2 emissions equivalent to removing nearly 100,000 automobiles from the highways and recovers sufficient energy to heat the equivalent of 15,000 homes. BMW recently expanded landfill gas use to its painting facility.

DaimlerChrysler surveyed the energy consumption at its Kenosha Engine Plant for equipment and lighting operations during non-production hours. An annual savings of 40 kWhr per engine produced has been achieved. This program prevents nearly 13,000 metric tons of CO_2 emissions annually. DaimlerChrysler's Sterling Heights Assembly Plant implemented a steam trap maintenance and repair program to promote efficient operation of end-use heat transfer equipment, which prevents approximately 49,000 metric tons of CO_2 emissions on an annual basis.

Ford Motor Company, in partnership with Detroit Edison, developed an award winning "paint fumes-to-fuel" system that uses paint booth gases to generate electricity. The system captures paint booth fumes, a plant's largest source of emissions, and then uses them to produce electricity, reducing demand on public utility sources and CO2 emissions. The Wayne Assembly Plant uses landfill gas to heat and cool the facility, reducing the consumption of natural gas. The Ford Rouge Visitor Center houses a photovoltaic array, a solar thermal collector and an automated building management system. The adjacent Dearborn Truck Plant holds the world's largest living roof that reduces solar thermal load while ground cover converts CO_2 into oxygen.

General Motors Corporation received a gold certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program for its new Lansing Delta Township Assembly Plant. To date, the facility is the only automotive manufacturing plant in the world --as well as the largest facility and the most complex manufacturing site -- to receive any level of LEED certification. Over the first ten years of operations, the facility is expected to save over 30 million kilowatt hours of electricity.

In 2004, General Motors reduced approximately 1.4 million metric tons of carbon equivalent through prevention and recycling of paper, metals, plastics, organics, and other materials. Since June 2006, the roof of a GM parts warehouse in California has been host to a photovoltaic array with the ability to generate as much as 1.5 million kilowatt hours of electricity a year, which is expected to reduce overall electricity costs by 10 percent a year. To date, 14 GM plants have achieved compliance with the EPA

	Green Lights Program and reduced demand by over 30 Mega-watts, which is enough electricity to power a typical U.S. assembly plant. Additional plants are in process for similar improvements, worldwide. **Mitsubishi Motors'** manufacturing facility in Normal, Illinois achieved a 5% reduction in electrical demand during peak usage summer months in 2006 compared with 2005, reflecting Mitsubishi's efforts to improve energy efficiency. **Toyota Motor Engineering and Manufacturing North America** continues to implement its energy efficient lighting project to change metal halide fixtures to high bay fluorescent fixtures, and plans to expand its pilot projects on heat recovery beyond its paint shops to other operations and plants and to use waste heat from incinerators to create steam for various applications. Last year, such projects prevented approximately 12,000 metric tons of carbon dioxide emissions.
Program Reports and Other Links	To learn more about auto industry efforts to address Greenhouse Gases, see: Climate VISION (DOE website) Alliance of Automobile Manufacturers BMW Group — DaimlerChrysler — Ford Motor Company General Motors — Mazda — Mitsubishi Motors Porsche — Toyota — Volkswagen Energy Star Guide "*Energy Efficiency Improvement and Cost Saving Opportunities for the Vehicle Assembly Industry*" Energy Star Awards *For additional information contact Valerie Ughetta, Director, Stationary Sources, Alliance of Automobile Manufacturers, vughetta@autoalliance.org*

(END)

Received 2/16/07 from Aluminum Association

2/15/07

Climate VISION Website update for Aluminum

The Aluminum Association and its members participating in the Voluntary Aluminum Industry Partnership (VAIP), representing 98% of primary aluminum production in the United States, have committed under the Climate VISION program to a direct carbon intensity reduction of emissions of perfluorocarbons (PFCs) and of emissions of CO_2 from the consumption of the carbon anode from the primary aluminum reduction process. The Climate VISION target is a 53% total carbon equivalent reduction from these sources by 2010 from 1990 levels. The industry has been working to reduce greenhouse gas emissions for over a decade and this new commitment equates to an additional direct carbon-intensity reduction of 25% since 2000. As a large industrial energy consumer, the primary producers also agree to continue their efforts to reduce indirect CO_2 emissions through continued energy efficiency improvements. This commitment builds on the efforts of the VAIP, a partnership program that EPA has had with the industry since 1995. The Aluminum Association is measuring progress for Climate VISION based on data collected from its members. The Aluminum Association also pledges to support climate protection through efforts to increase aluminum recycling and the development of lightweight vehicles.

The VAIP program led to reductions in PFC emissions by over 45% in 2000 compared to the industry's 1990 baseline. Progress under Climate VISION through 2004 achieved the objectives for 2010. Reductions achieved ion 2005 has resulted in a 56 percent reduction in direct process emissions per ton of production, including combined PFC and CO_2 releases.

GHG Information

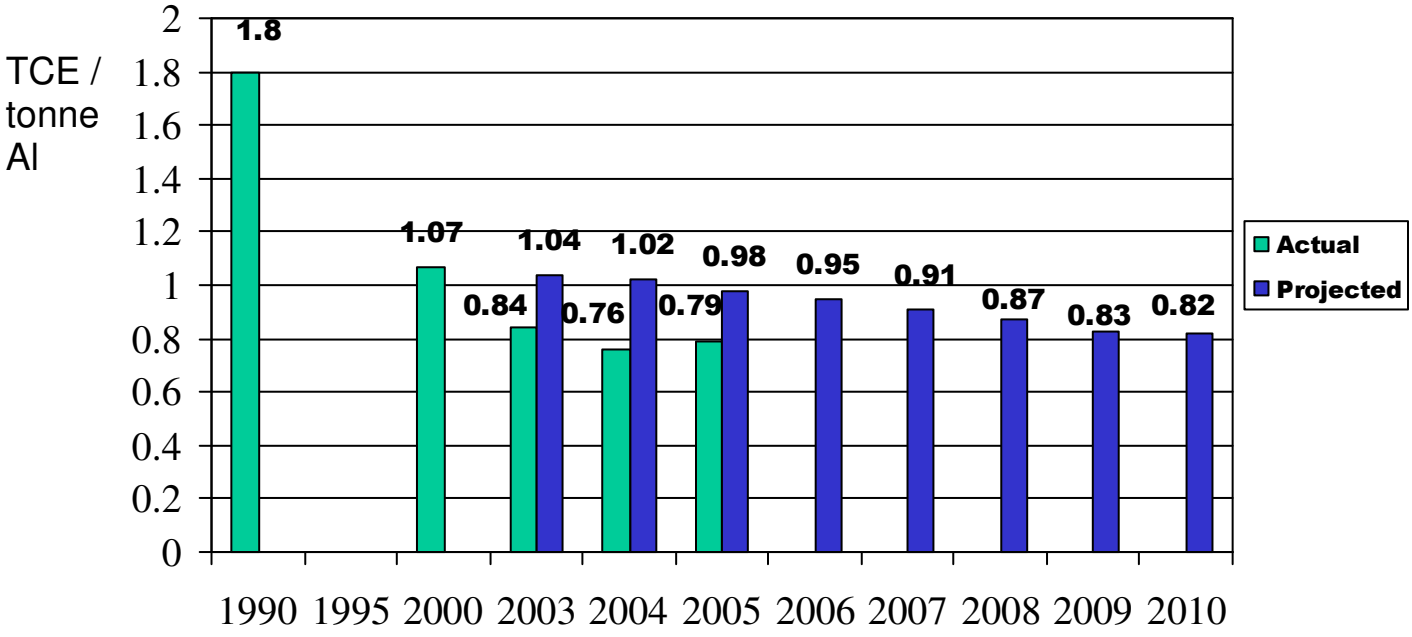
The primary aluminum industry emits PFCs and CO_2 directly from the production process and indirectly emits CO_2 from its energy consumption. In 2001, the U.S. industry's direct CO_2 emissions were 4.2 $TgCO_2Eq$, and its PFC emissions were 2.8 $TgCO_2Eq$ (EPA, 2006). In 2005, those emission rates were 4.2 TgCO2 Eq, and its PFC emissions were 3.0 (EPA, 2006).

Results

The Aluminum Association and the federal government have document progress in the Climate Vision program. The results are measured by metrics developed by the industry, in partnership with the government, and reported. Progress will also tracked under the umbrella of the Voluntary Aluminum Industrial Partnership web site. Please check back on this web site and the Energy Information Agency web site for updates. In 2005, the industry achieved the goal set for 2010. A 56 percent reduction in direct process emissions per ton of production, including combined reductions in PFC's and CO_2, exceeds the 53 percent commitment for 2010. Further progress is expected in the industry, however complications from high power costs and potential curtailments make predictions for further reductions difficult to predict.

Direct Process Emission 2010 Goals :
53% below Year 1990; 25% below Year 2000
Achievement : 56% reduction 1990 to 2005

*Source: EPA Climate Protection Division



For absolute reductions, in 2005 the Partnership reduced direct CO2-equivalent emissions by 8.39 MMTCO2-eq compared to business-as-usual (2.29 MMTCE).

Curbside Value Program

The Climate Vision agreement includes efforts to address mechanisms to improve recycling of aluminum cans. To achieve can recycling progress, a pilot program is underway called the Curbside Value Partnership (CVP). The CVP is a national partnership funded by the Aluminum Association and the Can Manufacturers Institute, offered to cities, waste haulers, and MRFS, designed to increase the economic value and payback of local curbside recycling streams. The goals of the program include:

Increase the aluminum can recycling rate
Create a cost effective model for cities to implement self-sustaining recycling programs.

Promote self sustaining recycling efforts by emphasizing value for the community and by providing advantageous business models to provide collection incentives.

For 2006, the CVP program is working to achieve a 50% participation rate by the top 100 MRF's in the United States. As of mid-2004, 25 MRF's were actively participating in the CVP efforts and reporting mechanisms, and approximately 25 percent more MRF's had signed up to the CVP program. More information on the CVP is available at their website: http://www.recyclecurbside.org/

Spent Potliner (SPL) Waste Utilization Program

SPL is a waste byproduct from primary aluminum production comprised of disposed solid carbonaceous material when aluminum production cells are relined. A two phase testing program has been completed in late 2005 and demonstrates the feasibility and substantial energy, emissions and kiln production benefits of SPL processing. The benefits from SPL use in cement kilns include: complete kiln destruction of all SPL waste constituents of concern eliminating landfill disposal, reduction of cement kiln nitrogen oxide emissions, improved clinker quality from SPL mineralization benefits and fluoride utilization (also reducing the need for fluorspar in cement kiln operations), and reduced feedstock needs of alumina and silica for cement production. SPL used in a cement kiln would replace the equivalent of at least 1/3 of a ton of coal and result in a greater output of cement production.

Energy efficiency, transportation sector – light-weight vehicles, recycling

Together with the North American automotive industry, the Aluminum Association has conducted a comprehensive Life Cycle Assessment (LCA) of aluminum use in the automobile and light truck transportation segment. The peer reviewed study demonstrated that one pound of aluminum used in automobiles and light trucks saves over the lifetime of the vehicle an average of at least 20 pounds of carbon dioxide equivalent emissions. Aluminum use in the automobile and light truck market of the U.S. has grown from an average of 183 pounds per vehicle in 1991, to 295 pounds in 2004. Current projections forecast that this trend will continue with aluminum use expected at levels over 315 pounds per vehicle on average in 2010. At those projected aluminum use levels, at least 820 pounds of carbon dioxide equivalent emissions will be saved per vehicle produced over their operating lifetime for 2010 models compared to 2002 models.

GHG Measurement and Reporting Protocol

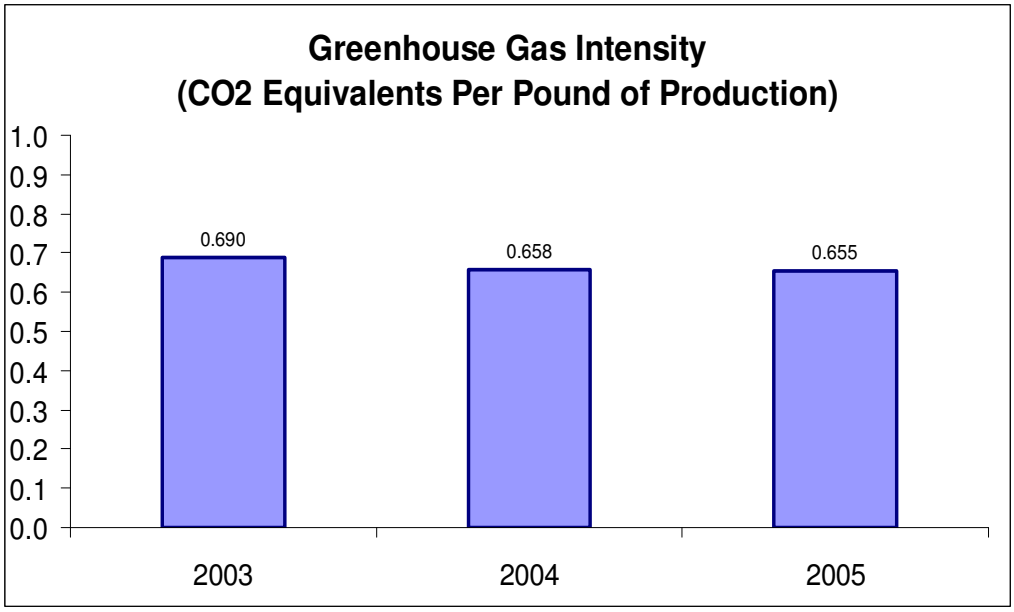
In a continuing effort to advance and improve the measurement of greenhouse gas emissions from aluminum operations, the industry through cooperative efforts with the International Aluminium Institute (IAI) and EPA, has recently seen approval in October 2006 by the World Resources Institute (WRI) a revised and updated Aluminum Sector Greenhouse Gas Inventory Protocol.

Received 2/13/07 from American Chemistry Council (Lorraine Krupa-Gershman)

Chemicals

Highlights	Between 1990 and 2005, the US chemical industry's greenhouse gas (GHG) intensity improved by 30.6%, with an outright 10% reduction in GHG emissions (30 million metric tons). Since 1970, the US chemical industry has reduced fuel and power energy consumption per unit of output by 46%. Much of the energy consumed by the chemical industry is then used to make materials that make the rest of the economy more energy efficient. In 2003, ACC established a greenhouse gas intensity reporting mechanism under its Responsible Care® program to obtain more specificity on GHG intensity reductions by ACC members. Between 2003 and 2005, American Chemistry Council (ACC) member companies have reduced their greenhouse gas intensity per pound of production by 5% and improved their energy efficiency by 1.5%.
Industry Sector and Participants	The American Chemistry Council (ACC) represents the leading companies engaged in the business of chemistry. ACC members apply the science of chemistry to make innovative products and services that make people's lives better, healthier and safer. ACC is committed to improved environmental, health and safety performance through Responsible Care®, common sense advocacy designed to address major public policy issues, and health and environmental research and product testing. The ACC represents 85% of the basic industrial chemical industry production in the U.S. The business of chemistry is a $558 billion enterprise and a key element of the nation's economy. It is the nation's largest exporting sector, accounting for ten cents out of every dollar in U.S. exports. Chemistry companies are among the largest investors in research and development.
Primary CV commitment	American Chemistry Council members have committed to lowering their collective greenhouse gas intensity 18% by 2012, using 1990 as the base-reporting year.
Additional CV Commitments	ACC members will continue to manufacture products and pursue innovative new ways to help other industries and sectors achieve the president's goal.
Related Industry Programs	Recognizing the importance of industry transparency, in 2003 ACC began collecting member data through its Responsible Care® program on energy efficiency and greenhouse gas emissions. In 2005, ACC began publicly reporting aggregated member results on improving energy efficiency and greenhouse gas intensity. The Responsible Care® Energy Efficiency Awards program is among ACC's many ongoing efforts to improve energy efficiency. These projects have the added benefit of reducing greenhouse gas emissions. Since 2003, the 76 award winners have reduced GHG emissions by over 4 million tons.

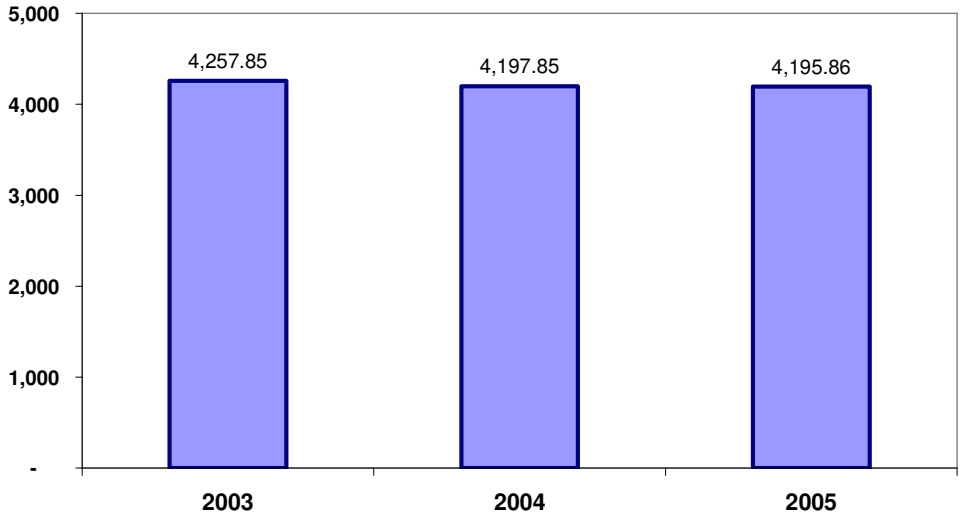
Industry Actions taken	One method in which the industry is advancing energy efficiency is through the use of cogeneration – the simultaneous generation of electricity and steam from a facility that is located at or near the manufacturing site. Since cogeneration facilities use fuel to produce both electricity and steam, they are much more efficient than the older, stand alone electric utilities and conventional steam boilers. Today, nearly a third of all cogeneration used in manufacturing is conducted by the business of chemistry.
Metrics Identified	Through the Responsible Care® program, ACC members have established metrics that will measure greenhouse gas emissions and energy consumption. From 2003 through 2012, ACC will collect data directly from members to measure progress, and will report this progress publicly. Greenhouse gas (GHG) intensity for the business of chemistry is the ratio of net greenhouse gas emissions to pounds of production. Through our Responsible Care® website (http//www.responsiblecare-us.com), our companies have compiled their greenhouse gas emission data, and ACC began publicly reporting their aggregated progress in 2005.
Measured Results to Date for ACC Members	Between 2003 and 2005, ACC member companies have reduced their greenhouse gas intensity by 5.0 percent. In absolute terms, Responsible Care® companies reduced their emissions of greenhouse gases by 17.9 million tons expressed as CO_2 equivalent over the same time period.



AGGREGATED DATA	2003	2004	2005	CHANGE
GHG INTENSITY (POUNDS CO2 EQUIVALENTS/POUND OF PRODUCTION)	0.690	0.658	0.655	**-5.0%**

Also, between 2003 and 2005, ACC member companies improved their energy efficiency by 1.5 percent. This is the equivalent of 141 billion Btu.

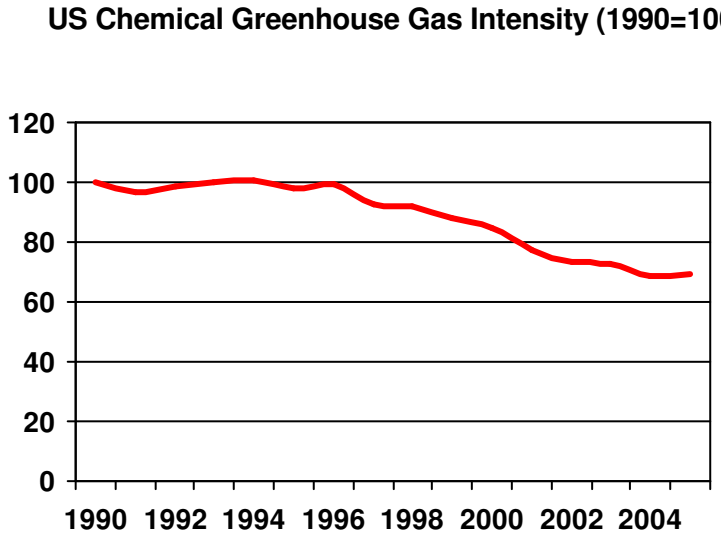
Energy Intensity
(BTUs Per Pound of Production)



AGGREGATED RESPONSIBLE CARE COMPANY DATA	2003	2004	2005	Change
ENERGY EFFICIENCY (Btus/Pound of Production)	4,258	4,198	4,196	**-1.5%**

Measured Results to Date for the US Chemical Industry

Between 1990 and 2005, the US chemical industry's GHG emissions fell 10.0%. At the same time, the industry's production rose 29.6%. As a result, GHG intensity improved 30.6%. Between 1990 and 2000 greenhouse gas intensity reductions averaged 1.4% per year. During the 2000-2005 time period, the rate of reduction in GHG intensity accelerated and improvements averaged 3.9% per year.



Million metric tons of CO_2 equivalent	1990	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Fuel & Power CO_2	228.2	250.6	253.3	250.8	254.0	249.0	231.3	230.7	235.3	225.7	227.1
Process CO_2	2.7	3.3	3.5	3.4	3.4	3.4	3.4	3.5	3.5	3.9	3.8
Total Carbon	230.9	253.9	256.8	254.2	257.4	252.4	234.7	234.2	238.8	229.6	230.9
Nitrous Oxide	33.0	37.7	31.5	26.9	25.6	25.6	20.8	23.1	22.9	22.3	21.8
Methane	1.3	1.7	1.8	1.8	1.8	1.7	1.5	1.5	1.5	1.6	1.4
HFCs, etc.	35.0	31.1	30	40.1	30.4	29.8	19.8	19.8	12.3	15.6	16.0
Total GHG Emissions	**300.2**	**324.4**	**320.1**	**323.0**	**315.3**	**309.5**	**276.8**	**278.6**	**275.5**	**269.1**	**270.1**
Indices (1990=100)											
GHG Emissions	100.0	108.0	106.6	107.6	105.0	103.1	92.2	92.8	91.8	89.6	90.0
Chemical Industry Output	100.0	108.8	115.3	117.2	119.6	121.4	119.2	126.4	126.0	130.0	129.6
GHG Emissions Intensity	100.0	99.3	92.5	91.8	87.8	84.9	77.3	73.4	72.8	69.0	69.4

Source: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004 (EPA), ACC, ACC analysis

The sources for overall US chemical industry GHG emissions data include: 1) *Emissions of Greenhouse Gases in the United States 2004* prepared by EIA; and 2) *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004* prepared by the US Environmental Protection Agency (EPA). All emissions data are measured as carbon dioxide equivalents.

ACC collects and maintains times series data on energy consumption and through analysis, GHG emissions for the chemical industry. Energy consumption data and

	other greenhouse gases are available back to 1990.
Company projects and activities	For the past several years, ACC has honored member companies for energy efficiency improvements in five categories: Environmental Impact, Energy Efficiency Program, Non-Manufacturing Improvement, Public Outreach, and Significant Improvement in Manufacturing. For example, in 2005, 11 ACC member companies were honored for implementing energy efficiency improvements that together saved enough energy to power a metropolitan area the size of South Bend, Indiana and reduced carbon dioxide emissions equivalent to 475,000 cars. ACC presented a total of 26 awards to these companies for their company-wide or plant-specific progress. For 2005, the total annual energy savings represented by the awards is 22.7 trillion BTUs, while annual carbon dioxide emissions reductions were approximately 2,852,000 tons. The savings from the combined projects represent 0.7 percent of total chemistry energy consumption for fuel and power in 2005.
Program Reports and Other Links	Responsible Care® program: www.responsiblecare-us.com/energy_energy.asp www.responsiblecare-us.com/energy_greenhouse.asp American Chemistry Council website: www.americanchemistry.com ClimateVISION website: http://www.climatevision.gov/sectors/chemical/index.html

Received 2/7/07 from American Forest & Paper Association (Rhea Hale)

American Forest and Paper Association
Climate VISION Report

Highlights

Trees and wood and paper products are natural, renewable, and recyclable resources that help remove greenhouse gases (GHG) from the atmosphere and store them. The world's forests – and the wood and paper products that come from them – can be managed to help meet the challenges of global climate change and the needs of the global economy.

The Forest Products Industry's carbon footprint is diverse. Its components include direct and indirect emissions of carbon dioxide (CO_2) from manufacturing operations, the ability to sequester carbon in forests and products, and the ability to reduce methane emissions from landfills through its use of recycled paper. AF&PA members are meeting their Climate VISION commitment by pro-actively managing these components. Conserving energy, using renewable biomass energy, developing new biomass-based sources of energy, and using recycled materials are just of few of the ways member companies are reducing their green house gas emissions.

From 2000 to 2004 AF&PA member companies collectively reduced their direct greenhouse gas emissions 16%, from 61.2 to 51.4 million metric tons of CO_2 equivalent. This translates to a 12% reduction in intensity of direct emissions, from 0.514 to 0.453 tons of CO_2 equivalent per ton of production.

Indirect emissions associated with the generation of purchased electricity decreased from 26.8 to 26.2 million metric tons of CO_2 equivalent from 2000 to 2004 which translates to a 2.8% increase in intensity of indirect emissions due to smaller decrease in tons of production relative to indirect emissions.

In addition, in 2004, AF&PA member companies' use of recycled paper to make new paper products has resulted in avoided emissions of 23.3 million metric tons of CO_2 equivalents due to the avoidance of methane emissions from landfills where the paper would otherwise decay.

Carbon stored in trees becomes sequestered in wood and paper products for the duration of the product's useful life. In 2004, carbon stored in products produced by AF&PA member companies resulted in the sequestration of 25.7 million metric tons of CO_2 equivalent.

Together these annual offsets total 49 million metric tons CO_2 equivalent or approximately the same as the amount of AF&PA members annual direct emissions.

Climate VISION Commitment & Sector Description

Members of AF&PA are committed to collectively reducing their emissions intensity through programs that include: improving energy efficiency, enhancing sequestration in

forests and products, developing and implementing improved technologies, inventorying emissions, and increasing fiber recovery for recycling. AF&PA members estimate that these programs will reduce their greenhouse gas intensity by 12 percent by 2012 relative to 2000.

AF&PA's commitment is made on behalf of almost 200 members, who manufacture more than 84 percent of the paper and 62 percent of the wood and forest products produced in the United States.

Additional Commitments

AF&PA members also are pursuing a new paper recovery goal of 55 percent by 2012. Achieving this recovery rate will lead to corresponding reductions in greenhouse gas emissions by reducing methane emissions from landfills.

In 2005, the U.S. recovery rate for paper and paperboard reached 51.5 percent, and AF&PA is asking households and businesses across the country to help meet the new goal. AF&PA has created partnerships with organizations including the U.S. Environmental Protection Agency, Keep America Beautiful, and CarrAmerica to raise visibility for the goal and continue increasing recovery of high-quality fiber. Nearly 80 percent of U.S. papermakers use some recovered fiber in manufacturing new paper products, and substantial investments have been made in new machines for recycling.

Industry Actions

Early in the commitment period, AF&PA and its international counterparts retained the National Council for Air and Stream Improvement (NCASI) to develop tools for calculating emissions and determining the amount of carbon stored in forest products.

Emission Calculation Tools:

Working with international forest and paper associations, AF&PA and NCASI developed tools for estimating greenhouse gas emissions from pulp and paper mills and wood products facilities. These calculation tools recognize the industry's unique attributes – such as the carbon (CO_2) neutrality of biomass fuel emissions – and allow the industry to collect credible data that is comparable worldwide. The methodologies are based on the *Greenhouse Gas Protocol* created by the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). They received international peer review and were subsequently adopted by WRI/WBCSD for use with their protocol.

The pulp and paper mill calculation tools have a user interface to make the tools compatible with DOE's 1605(b) voluntary green house gas registry. NCASI will update the user interface in 2007 to reflect recent updates to the registry.

Product Sequestration Tool:

In addition to managing forests that store or sequester carbon, the forest products industry produces products that continue to store carbon. The harvesting and manufacturing of forest products essentially transfers carbon from the forests to the products. The carbon contained in these products continues to be sequestered from the atmosphere throughout the product life. In the case of building materials, this can be decades or longer.

The forest products industry has developed a calculation tool that companies can use to determine the amount of carbon stored in wood and paper products in use. The calculation method, also called "the 100 year method" was developed by Georgia Pacific Corporation and since endorsed by the International Council of Forest and Paper Associations (ICFPA). The method allows companies to use annual production to estimate their contribution to long-term product sequestration and has been adopted as an accepted method under DOE's guidelines for its voluntary GHG registry.

Metrics Identified

Working with NCASI, AF&PA members developed a protocol to monitor progress in each area described in the Climate Vision commitment. The protocol defines three metrics that characterize the industry's performance in terms of emissions and reductions to emissions from sequestration and recycling activities. Indirect emissions associated with the generation of purchased electricity and forest sequestration are also monitored but not formally included in calculating progress against the Climate Vision Commitment.

Direct Emissions Metric: This metric measures direct emissions of CO_2 from stationary combustion of fossil fuel. An earlier examination of emission sources determined that CO_2 emissions from stationary combustion of fossil fuels represent at least 90% of direct emissions from the U.S. forest products industry. In addition, it is these emissions that can be estimated with greatest accuracy. AF&PA collects data on fossil fuel consumption at member companies and these data, along with emission factors from the WRI/WBCSD GHG Protocol tools, are used.

Product Carbon Sequestration Metric: The industry calculates the annual carbon sequestration in forest products in-use using a method called "the 100-year method." This method, developed and first used by Georgia Pacific Corporation, and since endorsed by the International Council of Forest and Paper Associations (ICFPA) calculates the amount of carbon in the current year's production that is in products expected to be in use for at least 100 years. It has been adopted as one of the accepted methods under the 1605b program for Voluntary Reporting of Greenhouse Gases.

Avoided Methane Emissions Metric: EPA has examined the greenhouse gas and carbon implications of using various methods to manage the major components of the municipal solid waste stream including the effects of paper recycling on methane releases from municipal solid waste landfills. EPA's analysis has been used to develop emission factors representing the amounts of methane avoided per ton of paper recycled. The emission factors are then multiplied by the changes in the quantities of paper recycled by AF&PA members in any given year compared to a 2000 base year. The quantities of paper being recycled are determined based on data collected by AF&PA.

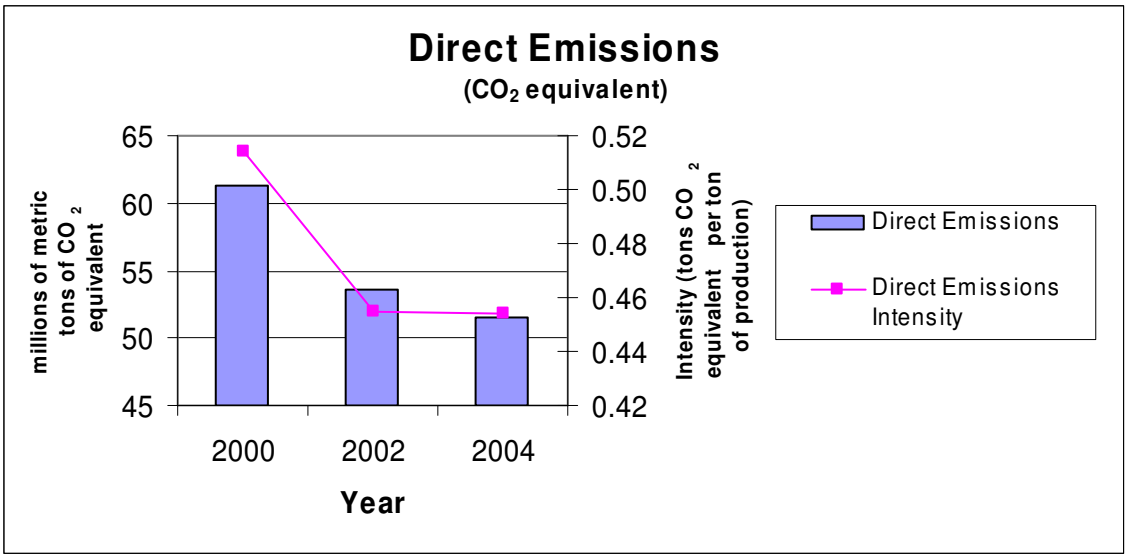
Other Measures Monitored

Indirect Emissions associated with the generation of purchased electricity: Although indirect emissions are not included in the AF&PA VISION commitment, the industry is tracking changes in these emissions. This is being done both to determine

whether improvements in direct emissions intensity are a result of increased power purchases, and to determine if the industry's purchases of power are changing dramatically. Indirect emissions are calculated from net purchases using the most recent average US emission factor for purchased electricity. The data on electricity consumption and sales come from the AF&PA biennial fuel and energy survey. The data are used to derive estimates of indirect emissions using methods analogous to those used for direct emissions.

Forest Carbon Sequestration: Forests play a crucial role in the global carbon cycle. Well-managed forests, improvements in their productivity, and the creation of new forests provide a powerful mechanism for removing carbon dioxide from the atmosphere. The forest industry owns a relatively small percentage of the world's forests, and AF&PA members' contribution to forest sequestration is not quantified in this report. However, the industry plays a major role in promoting and supporting sustainable forest management on all forestlands through its commitment to the Sustainable Forest Initiative® (SFI) Program. The SFI Program, the most recognized forest management standard and certification system in the U.S. and Canada, sets standards for maintaining long-term forest resources. Adherence to the SFI standard is a condition of membership for all AF&PA members.

Measured Results to Date



From 2000 to 2004 AF&PA member companies collectively reduced their direct greenhouse gas emissions 16%, from 61.2 to 51.4 million metric tons of CO_2 equivalent. This translates to a 12% reduction in intensity of direct emissions, from 0.514 to 0.453 tons of CO_2 equivalent per ton of production.

Indirect emissions associated with the generation of purchased electricity decreased from 26.8 to 26.2 million metric tons of CO_2 equivalent from 2000 to 2004 which translates to a 2.8% increase in intensity of indirect emissions due to smaller decrease in tons of production relative to indirect emissions.

In addition, in 2004, AF&PA member companies' use of recycled paper to make new paper products has resulted in avoided emissions of 23.3 million metric tons of CO_2 equivalent due to the avoidance of methane emissions from landfills where the paper would otherwise decay.

Carbon stored in trees becomes sequestered in wood and paper products for the duration of the product's useful life. In 2004, carbon stored in products produced by AF&PA member companies resulted in the sequestration of 25.7 million metric tons of CO_2 equivalent.

Together these annual offsets total 49 million metric tons CO_2 equivalent or approximately the same as the amount of AF&PA members annual direct emissions.

Detailed methodology and calculations for direct and indirect emissions, product sequestration and recycling metrics can be found at www. TBD (Link to AF&PA or DOE).

Energy and Biomass Use

Current energy data show that AF&PA members are focused on conservation and made great strides in reducing their reliance on fossil fuels between 2000 and 2004. The data below indicate that pulp and paper mills (per ton of production):

- Reduced fossil fuel use by 11 percent,
- Increased renewable energy use by over three percent, and
- Reduced overall energy use (from both fossil fuel and renewable energy sources) by almost three percent.

Energy per Ton of Paper Produced 2000 – 2004 (Million BTUs)

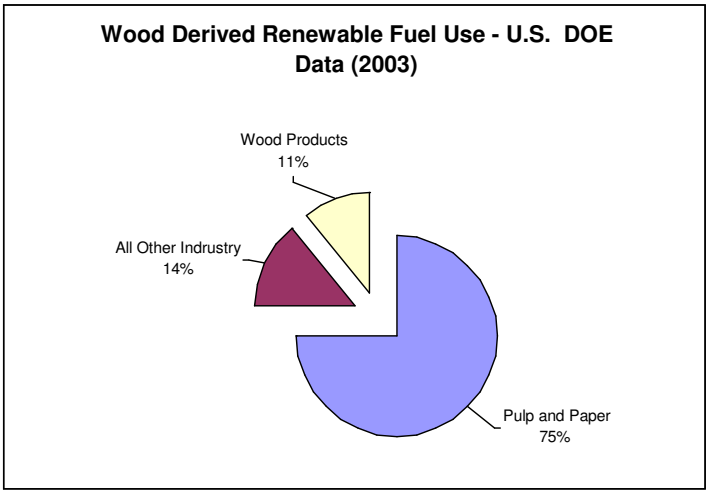
	2000	2002	2004
Fossil fuel	10.44	9.76	9.31
Biomass & hydroelectric	13.78	14.74	14.22
Total energy per ton	24.22	24.50	23.53

Additionally, according to the latest DOE figures, in 2002, 89 percent of electricity generated at paper mills was cogenerated (produced from steam generated on-site).[1]

[1] Energy Information Administration 2002 report on Energy Use in Manufacturing, Table 11.3 www.eia.doe.gov/emeu/mecs/mecs2002/data02/pdf/table11.3_02.pdf

The forest products industry leads all other industries in the use of biomass energy. The 2004 data indicate that seventy-seven percent of the fuel used at wood product facilities and sixty percent of the fuel used at pulp and integrated pulp and paper mills are biomass fuels. Biomass fuels are derived from wood, chips, bark, sawdust and pulping liquors recovered from harvesting and manufacturing processes.

DOE data show that wood products facilities and pulp and paper mills produced 86 percent of the biomass-based fuel generated by all industrial sectors in 2003.[2]



Energy-rich biomass results from tree growth that removes carbon dioxide from the atmosphere and transforms it into organic carbon. The Department of Energy's 1605b program for Voluntary Reporting of Greenhouse Gases, the Intergovermental Panel of Climate Change, the United States Environmental Protection Agency and other internationally recognized climate policy groups have concluded that greenhouse gas emissions totals should not include emissions of CO_2 associated with the combustion of sustainably managed biomass. As a result, biomass is often referred to as carbon (CO_2) neutral. Operationally "although these fuels do emit CO_2, in the long run the CO_2 emitted from biomass consumption does not increase atmospheric CO_2 concentrations if the biogenic carbon emitted is offset by the growth of new biomass."[3] It is assumed that

[2] Energy Information Administration, Industrial Biomass Energy Consumption by Primary Purpose of Business, Table H 1 http://www.eia.doe.gov/cneaf/solar.renewables/page/trends/tableh1.html

[3] US GHG Inventory to UNFCCC (1990-2004) page 3-11, Box 3-2 (2006 Submission) http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/3734.php

the carbon released during the consumption of biomass is recycled as U.S. forests and crops regenerate, causing no net addition of CO2 to the atmosphere.[4]

Related Industry Programs

The industry is involved in a wide variety of programs to develop renewable energy and promote understanding of forest sequestration. Two key research programs include:

- Biorefining/Gasification – Development of biorefining technology is an economic and technical priority under the Agenda 2020 Technology Alliance – an industry-led partnership that includes AF&PA member companies, academic partners, the U.S. Department of Energy (DOE) and the US Department of Agriculture (USDA). Biorefining uses advanced technologies to grow and convert forest materials to bio-energy and bio-products while manufacturing traditional products. The residual pulping liquors from the paper-making process are uniquely suited for gasification, and the resulting synthetic gas can be used for electric power, converted to fuels, or used to make high value chemicals.

- Forest Research – The industry is working with the US Forest Service, universities, and others on a wide range of forest sequestration research projects. In 2002, industry members and associations established the Forest Carbon Consortium to promote research on the potential of managed forests to store carbon and produce renewable energy. For example, the industry collaborated with the US Forest Service on development of a web-based tool for estimating forest carbon stocks using Forest Service national inventory data. The completed tool allows a user to define a region and estimate forest sequestration for that region.

Company Projects and Activities

AF&PA member companies are taking individual steps to reduce GHG emissions.

- They are calculating emissions and developing protocols for company-wide assessments. Data indicate that AF&PA members, representing over 60 percent of U.S. pulp and paper mill capacity, used the industry's emissions calculation tools to calculate greenhouse gas emissions in 2004.

- Members are making individual company commitments to reduce emissions through a variety of programs such as EPA's Climate Leaders, the Chicago Climate Exchange and Business Roundtable's Climate RESOLVE.

- They are conducting research and making results available. One company recently conducted a study of greenhouse gases in Douglas fir plantations in the Pacific

[4] US GHG Inventory to UNFCCC (1990-2004) Energy 3-0 (2006 Submission) http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/3734.php

Northwest and found that carbon sequestration is almost an order of magnitude greater than total emissions from forestry operations.

Member companies are also pooling their resources and taking collective action to promote development of renewable energy:

- Top forest products companies have committed to support a commercial scale biorefinery demonstration project in southeast Arkansas. This integrated facility, which will use both forest-based and agricultural feed stocks, is supported by state and regional governments, the local agriculture industry, and not-for-profit rural and sustainable development organizations.

- Several companies have contributed to the advancement of biorefining by hosting biomass gasification demonstration projects at their facilities.

All of these actions – individual and collective – will lead to future progress in addressing greenhouse gas emissions.

Program Reports and Other Links

More information on AF&PA and its members is available at www.afandpa.org.

Recycling guides for schools, offices, and communities and a recycling video are available at www.paperrecycles.org.

Tools for calculating pulp and paper mill and wood products facility emissions and the amount of carbon stored in wood and paper products are available at www.nacsi.org.

Information on the Agenda2020 program is available at www.agenda2020.org.

Highlights	The American steel industry has reduced its energy intensity per ton of steel shipped by approximately 15% from 2002 to 2006. Since 1990, energy intensity is down about 29%.
Industry Sector and Participants	The American Iron and Steel Institute (AISI) represents approximately 75% of the steelmaking capacity in the United States. Its 33 member companies include both integrated steelmakers, who produce steel from iron ore and scrap, and electric furnace producers, who typically produce steel from recycled steel scrap. AISI also works cooperatively with the Steel Manufacturers Association and the Specialty Steel Industry of North America, and the three organizations together represent nearly 100% of the total steel production in the U.S.
Primary CV commitment	AISI has committed to a Climate VISION goal of achieving by 2012 a 10 percent increase in sector-wide average energy efficiency using a 2002 baseline.
Additional CV Commitments	Additional AISI commitments included: (1) development of an industry-wide energy reporting protocol; (2) compilation and reporting of industry energy intensity on an annual basis; (3) fostering energy and climate-related communication among steel industry stakeholders; and (4) coordinating and encouraging collaborative research and development projects with significant potential for greenhouse gas abatement.
Related Industry Programs	As part of AISI's commitment to research and development into greenhouse gas reductions, and in conjunction with a global effort orchestrated by the International Iron & Steel Institute and referred to as the CO_2 Breakthrough project, AISI is coordinating a collaborative R&D effort that to date has included four projects. Two projects involve low carbon iron and steelmaking processes and two involve carbon sequestration. Ten companies are participating in this collaborative effort. The processing projects have been demonstrated to be technically feasible at bench scale and are being advanced to pilot-scale work. This is long-range R&D that has potential for significant change in the fundamental manner by which steel is made. In addition, AISI is an active participant in the steel task force of the Asia-Pacific Partnership, which involves a 6-nation effort to work toward technology-based solutions for energy and CO_2 reductions through identification of best iron and steelmaking practices, technology exchange, and collaborative R&D of the nature of the CO_2 Breakthrough project. Finally, AISI is working with the International Energy Agency and the OECD to identify iron and steelmaking energy use in various countries and to identify best practices that can adopted by steel companies on a global basis
Industry Actions taken	Following are industry actions taken to date: • Development of an industry-wide energy reporting protocol • Annual reporting of industry energy consumption • Organization of energy workshops • Initiation of collaborative R&D • Participation in the Asia-Pacific Partnership • Interaction with IEA and OECD to define steelmaking energy saving opportunities • Continued emphasis on steel applications with environmental benefits
Metrics Identified	As part of its Climate VISION commitment, AISI developed a standard steel industry sector-wide energy protocol and promoted the use of that protocol for both AISI and non-AISI steel industry companies. The data collected allow for reporting of energy consumption in terms of million BTU per ton of steel shipped. AISI is also advocating use of the protocol by the

<table>
<tr><td></td><td>International Iron & Steel Institute, the Asia-Pacific Partnership's steel task force, and the International Energy Agency.</td></tr>
<tr><td>Measured Results to Date</td><td>Based on data collected for 2003, 2004, 2005, and 2006 the American steel industry has demonstrated increasing energy efficiency resulting in an overall reduction of its energy intensity per ton of steel shipped by approximately 15 percent between 2002 and 2006.

<table>
<tr><th>Item</th><th>2002</th><th>2003</th><th>2004</th><th>2005</th><th>2006</th></tr>
<tr><td>Tons Shipped</td><td>100,000,000</td><td>106,000,000</td><td>111,400,000</td><td>105,000,000</td><td>109,500,000</td></tr>
<tr><td>Million BTU per Ton Shipped</td><td>13.6</td><td>12.6</td><td>12.2</td><td>12.0</td><td>11.6</td></tr>
</table>

Since 1990, energy intensity has been reduced by about 29 percent, and it is estimated that carbon dioxide (CO_2) emissions were reduced by 16 percent from 1990 to 2006.</td></tr>
</table>

Company projects and activities (Success stories)

A cross-sector breakthrough project developed by the steel industry, in cooperation with DOE's Industrial Technologies Program, is advanced high strength steels, or AHSS. Ten research projects which cost $6.3 million (federal and steel industry funding) have focused on AHSS, which permit the design of automobiles that are lightweight (thus greatly reducing fuel consumption and consequently emissions) but also retain all the safety and affordability of basic carbon steel. AHSS are rapidly being adopted by automakers. The following benefits are calculated using a market penetration of only 7% of AHSS- type vehicles, a low hurdle given the rapid adoption already evidenced in the new Ford 500 and Chrysler Pacifica:

Item	Savings per year	Savings per year/ per federal $ spent	$ Savings per year at $60/barrel
Barrels of oil	4,071,429	0.84 barrel	$244.4 million
CO_2 emissions reduction (tons)	2,100,000	0.50	N.A.

AISI member companies are collaborating on a research program entitled the CO2 Breakthrough Program. Its objective is to develop new steelmaking technologies that emit little or no CO2. There are four projects in the program, described briefly below:

1] The Massachusetts Institute of Technology is developing Molten Oxide Electrolysis (MOE), technology in which a metal oxide feedstock is converted to liquid metal and oxygen gas. During the process, no CO or CO2 is produced. According to Donald Sadoway, principal investigator at MIT, "Molten Oxide Electrolysis in conjunction with carbon-free electricity will usher in the era of sustainable metallurgy". This research could break major new ground in terms of CO2 emissions reductions and results thus far are encouraging enough that a proposal for a pilot scale plant is now under review. Please see http://www.steel-trp.org/TRPGreenBook2006/9956factsheet.pdflease

2] The University of Utah is developing a new "flash smelting" ironmaking process using hydrogen and fine iron oxide concentrates. This new process will not only use a clean fuel but also make use of very fine iron oxides, which are plentiful in the US. It has the potential to eliminate coke ovens, blast furnaces and thus their CO2 emissions. It has also proceeded successfully to the point where researchers are proposing a pilot plant to further test the process at larger scale. Please see http://www.steel-trp.org/TRPGreenBook2006/9953factsheet.pdf

The steel industry is also funding 2 sequestration projects as well [Note: not by traditional biological sequestration, but by geological methods]

3] At the University of Missouri-Rolla, the process under development will directly remove CO2 from steelmaking furnace [BOF and EAF] exhaust gases and react them so as to create carbonates suitable for polymer, agricultural and construction applications, thus capturing and storing the CO2. Please see http://www.steel-trp.org/TRPGreenBook2006/9955factsheet.pdf

4] At Columbia University, chemical pathways for mineral sequestration are being researched which can result in a process, which is a combination ironmaking plant and carbon disposal unit. Please see http://www.steel-trp.org/TRPGreenBook2006/9957factsheet.pdf

The two sequestration projects are early in development, but should they show similar promise as has been seen at MIT and University of Utah, the project research will continue.

AISI and McMaster University have developed the Paired Straight Hearth Furnace (PSH).

	This technology doubles the capacity of existing hearth reduction processes and can be used to process iron from plant wastes and iron ore. This technology can stand alone to produce low-cost direct reduced iron [DRI] or be coupled with AISI's direct smelting technology making it more productive and thus more economically attractive. Plans for a demonstration project are now being formulated. The Mesabi Nugget Project is a large-scale pilot project which successfully demonstrates the innovative ITmk3® ironmaking technology developed by Kobe Steel for the North American scenario. The process is capable of using low-grade ore to produce iron nuggets of superior quality to DRI and similar quality to pig iron. The ITmk3® process uses a rotary hearth furnace to turn iron ore fines and pulverized coal into high nugget purity (96-98% metallic iron content). Reduction, melting, and slag removal occur in only 10 minutes. The iron nuggets are suitable for use in electric arc furnaces (EAF), basic oxygen furnaces (BOF), and foundry applications. If successfully commercialized, the process will reduce the energy intensity of steelmaking.
Program Reports and Other Links	More detail on AISI's Manufacturing & Technology programs relating to climate change and energy is available at http://www.steel.org/AM/Template.cfm?Section=Manufacturing_SHP and http://www.steel.org/AM/Template.cfm?Section=Energy&Template=/TaggedPage/TaggedPageDisplay.cfm&TPLID=51&ContentID=12143

Highlights	America's oil and natural gas companies are addressing climate change issues as the world's demand for energy increases – driven in large part by economic and social development needs to raise living standards of growing populations around the world. Working with the Department of Energy's ClimateVision program in 2003, API established its Climate Challenge Program building on the oil and gas industry's earlier work addressing climate change. API members are investing hundreds of millions of dollars to advance the cutting edge technologies and energy sources that will help address climate change in both the near-term and long-term. Working with government, academic research groups and others, member companies are undertaking diverse actions addressing GHG emissions including: • Increasing energy efficiency as well as developing and promoting alternative energy use to reduce greenhouse gas emissions; • Reducing natural gas flaring and expanding supplies of low-carbon natural gas; • Establishing rigorous, industry-wide tools and procedures for estimating and tracking emissions; and • Developing new energy technologies as well as carbon capture and storage technology that could reduce or sequester emissions. As part of API's Climate Challenge Programs, refiners set a goal of improving their energy efficiency by 10 percent between 2002 and 2012 and are on track to meeting this objective. In the second year of this effort (2004), the energy saved by API members was equivalent to taking more than 350,000 cars off the road with a corresponding impact on greenhouse gas emissions. Individually, API companies are undertaking a diverse set of actions to mitigate greenhouse gas emissions including energy efficiency, advanced technology, reducing methane emissions, and developing methods to store CO_2 underground safely for thousands of years. Accurate estimation of greenhouse gas emissions is indispensable to responsibly addressing climate change and API has developed comprehensive tools for estimating emissions throughout the oil and gas industry. These tools are available free to any oil and gas company at http://ghg.api.org .
Industry Sector and Participants	API represents nearly 400 members companies involved in all aspects of the oil and gas industry as well as other energy technologies. Examples of actions taken by companies under the Climate Challenge Program are drawn from the voluntary actions of API members. Additional information can be obtained at http://www.api.org/ehs/climate/
Primary CV Commitment	As part of API's Climate Challenge Programs, refiners have set a goal of improving their energy efficiency by 10 percent between 2002 and 2012.

Additional CV Commitments	In response to the mission of ClimateVISION, API and its members implemented the Climate Challenge Program with three major efforts structured to reflect the broad diversity of API members. *Major components of the Climate Challenge Program commitments and subsequent actions are addressed below.*
Related Industry Programs	API and its members are addressing climate through a variety of avenues including working with the National Petrochemical and Refining Association (NPRA**)** to track improvements in nation's overall refinery energy efficiency; working with EPA's Natural Gas STAR and Natural Gas Star International programs to reduce methane emissions from natural gas operations; partnering with the World Bank's Global Gas Flaring Reduction (GGFR) program to overcome barriers to reducing associated natural gas flaring.
Industry Actions Taken	Through API, the oil and gas industry's primary trade association, companies are working together to create synergies in addressing climate change and speed the flow of information within the industry. In December 2006, API held its 4th conference (see http://www.api.org/ehs/climate/new/index.cfm) on industry voluntary actions. API also is distributing a software tool, SANGEA™, which is one *Compendium* compliant method companies can use to estimate their greenhouse gas emissions. API has related joint projects with the International Petroleum Industry Environmental Conservation Association (IPIECA) focusing on GHG emissions estimation and reduction tools.
Metrics Identified	Metrics for tracking progress vary depending on the individual goal. Metrics include: • The 10% refinery energy efficiency improvement goal for 2002-2012 is being tracking with the third-party Solomon Refinery Energy Intensity Index. The Solomon EII data are available every two-years. • Participation in EPA's Natural Gas STAR program is being tracked by the share of API member natural gas production from companies participating in the Gas STAR program. • Future reporting under the recently initiated annual industry-wide aggregate greenhouse gas emissions reporting program is expected to focus on metric tons of emissions and GHG-intensity of operations.
Measured Results to Date	*10% refinery energy efficiency improvement goal for 2002-2012:* Based on the most recent data, the industry is on track to meet its goal and the energy saved by API members in 2004 was equivalent to taking more than 350,000 cars off the road. *100% participation goal in EPA's Natural Gas Star Program:* According to EPA, API members have reduced methane emissions almost 180 billion cubic feet in their long-standing participation in the Natural Gas

	STAR program. Now, virtually all the natural gas produced by API members is from companies participating in Natural Gas Star. *Tools for consistent and comprehensive estimation of greenhouse gas emissions from oil and gas operations throughout the world:* o API with two other international oil and gas groups (IPIECA and OGP) issued *Guidelines* setting a framework for GHG emissions estimation for the global oil and gas industry; o API's first-of-a-kind *Compendium* details comprehensive and consistent GHG emission calculation methods for oil and gas industry operations. The robust methodology of the *Compendium* is recognized in DOE's "1605b Guidelines" for GHG emissions reporting; o API's website (http://ghg.api.org) makes the latest versions of these tools available free to the public and oil and gas companies. *Annual industry-wide aggregate greenhouse gas emissions reporting:* API recently initiated the first U.S. oil and gas industry survey of carbon dioxide and methane emissions with a goal of public reporting aggregate data after the reliability and consistency of the data is established.
Company Projects and Activities	*The following examples illustrate some of the steps being taken individually by API members under the Climate Challenge Programs.* The actions reflect the diversity of the industry and the wide range of strategies being undertaken to address GHG emissions. ***Improving Energy Efficiency*** • One company implemented a five-year $350 million program to increase energy efficiency. In 2005, total primary energy consumption at this company was approximately 2% less than in 2004. • An API member reduced CO_2 emissions by nine million metric tons a year through more efficient production of steam and electric power by investing in 85 cogeneration facilities at some 30 company locations worldwide. • Through it's energy efficiency subsidiary (4^{th} largest in the U.S.), one company saved its customers 177 million kilowatt hours of electricity and 1.2 billion cubic feet of natural gas in 2005 alone. • Numerous companies are participating in energy efficiency-oriented voluntary partnerships including EPA's SmartWay Transport, National Environmental Performance Track, and Combined Heat and Power Partnership programs. ***Natural Gas/ Flaring/Gasification*** • API members are undertaking a wide range of actions under the domestic Natural Gas STAR program to reduce methane related emissions. A single company achieved cumulative methane gas emission reductions in U.S. operations equivalent to 6.4 million metric tons of CO_2. • Members are utilizing new equipment and procedures to minimize or eliminate flaring at both upstream and downstream facilities. • By investing in natural gas production and liquefied natural gas facilities, companies are facilitating greater use of lower-carbon natural gas. • Taking a global perspective, members are implementing methane related projects in world-wide operations including increased use of natural gas to provide needed electricity in developing countries, reducing natural gas

	flaring, and undertaking new pipeline projects to recover produced gas for beneficial use and reducing or eliminating flaring.
	Carbon Capture and Storage (CCS)
	• Companies are injecting millions of tons of CO_2 into aging U.S. oil fields in enhanced oil recovery (EOR) operations. This boosts U.S. oil production, reduces U.S. oil imports, and stores CO_2 that could have been vented into the atmosphere. CCS projects also are being undertaken abroad.
	• A number of members are participating in CCS research and development efforts including the $50 million international CO_2 Capture Project, the Carbon Mitigation Program, DOE's Regional Sequestration Projects, and the International Energy Agency's CO2ReMove project.
	Advancing Energy Technologies
	• Members are operating wind farms in the U.S. and Europe.
	• Multiple companies are expanding U.S.-based solar energy production capacity to meet growing demand and to create jobs.
	• One member - the world's largest producer of geothermal energy - is expanding its output.
	• Another company is undertaking hydrogen production technology and basic fuel cell system R&D, and building hydrogen refueling stations in preparation for possible commercialization of fuel cell vehicles.
	• Several members are working with auto and heavy equipment makers to design high-efficiency, low-GHG emission fuel/engine systems.
	• One company is partnering to develop and market advanced biofuels with properties that overcome the limitations of existing biofuels.
	• One member is undertaking a $1 billion investment to construct the first-of-its-kind plant to gasify petroleum coke, generate electricity, capture and permanently store the CO_2 while boosting U.S. oil production.
	Research and Development / Partnering
	• API members are partnering with major research institutions on a broad range of potential climate and energy technologies for the future including:
	  ○ The Carbon Mitigation Initiative at Princeton University developing globally affordable CO_2 emission reduction strategies;
	  ○ Georgia Institute of Technology, U.C.-Davis, and the DOE's National Renewable Energy Laboratory research on cellulosic biofuels and hydrogen transportation fuels;
	  ○ A new $500 million Energy Biosciences Institute at a major UK University focusing on cleaner transport fuels;
	  ○ Stanford University's Global Climate and Energy Project addressing more than 27 different energy/environment projects;
	  ○ Imperial College of London's Urban Energy Systems project on city energy, people and material flows;
	  ○ A 10 year program at the Chinese Academy of Science and Tsinghua University, Beijing on clean energy breakthrough technologies.

Program Reports and Other Links	• Updated information on API and company actions on climate can be found at: http://www.api.org/ehs/climate/ • Tools for estimating GHG emissions for the oil and gas industry can be downloaded from http://ghg.api.org

Business Roundtable's Climate RESOLVE – Voluntary Actions Across Business Sectors to Control GHG Emissions

Summary	Through its Climate RESOLVE program, Business Roundtable is encouraging voluntary actions to control greenhouse gas emissions (GHG) by every company in every economic sector. Approximately 70 percent of Roundtable member companies are participating in the program. The Roundtable has held five workshops and 28 telephone learning sessions to help companies develop and improve their GHG management programs, and also launched a special initiative aimed a service sector companies. Information on Climate RESOLVE and GHG management can be found at www.businessroundtable.org.
Industry Sector and Participants	Business Roundtable is an association of chief executive officers of leading U.S. companies from every sector of the economy, with over $4.5 trillion in annual revenues and more than 10 million employees. Member companies comprise nearly a third of the total value of the U.S. stock market and represent nearly a third of all corporate income taxes paid to the federal government.
Primary Climate Vision Commitment	Business Roundtable launched Climate RESOLVE (**R**esponsible **E**nvironmental **S**teps; **O**pportunities to **L**ead by **V**oluntary **E**fforts) in 2003 because of a belief that every company in every sector of the economy should take voluntary action to control greenhouse gas (GHG) emissions. While individual companies will take different steps to control GHG emissions, the combining of these actions will have real results. • Approximately 70 percent of the Roundtable's 160 members have joined Climate RESOLVE to date. The ultimate goal is 100 percent participation. • The Roundtable continues to actively recruit members -- with a particular emphasis on increasing services sector participation.
Additional Climate VISION Commitments	As an additional commitment to Climate VISION, the Roundtable, through Climate RESOLVE, is helping companies develop and improve – and in some cases, establish – greenhouse gas management programs. The Roundtable is committed to providing education and support to companies at all stages: • Expert one-on-one consulting advice. • Annual workshops. Click for more information • Telephone learning sessions. Click for more information The U.S. Department of Energy (DOE) and Environmental Protection Agency (EPA) are providing valuable technical support, including presentations at Climate RESOLVE workshops, learning sessions and in creation of a Web toolkit for companies. A comprehensive library of Climate RESOLVE resources for Roundtable members is available at this link.
Related Industry Programs	The Roundtable has launched an initiative aimed at helping service sector companies understand the need for companies in that sector to address GHG emissions. The initiative includes a special step-by-step Web tool, developed with the assistance of the EPA and DOE, to help companies establish and

	maintain energy efficiency programs. As part of the initiative, the Roundtable also produced a guide for companies with suggestions on everyday actions that can improve efficiency and address climate change. The toolkit – RESOLVE to Improve Energy Efficiency in Office Buildings – can be found at: http://www.businessroundtable.com/pdf/ClimateRESOLVE/energypaper_final.pdf
Industry Actions Taken	Since the launch of Climate RESOLVE in early 2003, the Roundtable has: • Conducted **five workshops** for companies to provide practical hands-on guidance on how to reduce, avoid, offset or sequester GHG emissions, with participation of more than 110 companies in 2006 and nearly 100 companies at 2004 and 2005 workshops. Many workshop presentations can be found on the Climate RESOLVE section of www.businessroundtable.org; • Held more than **28 telephone learning sessions** for companies with experts on GHG management on issues such as successful energy management, improving quality of GHG data and renewable energy; • Compiled **20 case studies** of voluntary examples – from a variety of business sectors, that can serve as best practices for other companies; • Developed **extensive resources** for companies on Climate RESOLVE section of www.businessroundtable.org, including a new member toolkit, workshop presentations, guides and links to federal resources; and • Provided **one-on-one consulting support** for companies.
Metrics Identified	Through Climate RESOLVE, the Roundtable encourages companies to report their progress to federal programs such as the 1605 (b) program. The percentage of companies involved in Climate RESOLVE is another key metric.
Measured Results to Date	Early in 2004, the Roundtable surveyed all Climate RESOLVE participants about GHG management efforts, and issued a report on September 22, 2004. The report showed that 70 percent of Roundtable member companies were enrolled in Climate RESOLVE. Other key findings included: • 92% had reviewed their GHG emissions profile or were doing so in 2004. • 89% had taken or were taking actions to reduce, avoid, offset or sequester GHG emissions • 71% had established or were establishing written policies to track and meet GHG emissions goals. • 72% had reported or were reporting GHG management activities to the public. • 76% had participated or were participating in government-sponsored programs to reduce, avoid, offset or sequester GHG emissions. • 61% had invested or were investing this year in new technologies or products to improve energy efficiency, reduce GHG emissions or lower GHG intensity in the environment.

Company projects and activities (Success stories)	**Air Products** (www.airproducts.com) is a global gases, chemicals, equipment and services provider with operations in more than 30 countries. In its effort to minimize its transportation footprint, Air Products sets "miles per gallon" targets to increase fleet efficiency, and practices real-time monitoring to minimize trips and increase volume per delivery. Within its supply chain, it has partnered with customers to improve efficiency of combustion systems and reduced electronics customers' perfluorinated compound emissions by as much as 85 percent. Other key efforts aimed at significantly improving the efficiency and economics of supply chain projects include ion transport membrane syngas and oxygen technologies, which are being developed with U.S. DOE support. Air Products has also partnered with energy suppliers to optimize their generation efficiency by shutting down its production in times of peak demand and loading up on production at other times. Air Products also works with leading companies, governments and universities to develop technologies that reduce the cost of capturing carbon dioxide from chemical production and power generation, and safely sequester it. The Noel Kempff Mercado Climate Action Project (www.noelkempff.com) is a partnership between the Government of Bolivia, The Nature Conservancy, Fundación Amigos de la Naturaleza, **American Electric Power** (www.aep.com), **PacifiCorp** (www.pacificorp.com) **and BP** (www.bp.com). The project involved the purchase and retirement of timber companies' logging rights on two million acres of biologically diverse tropical forests in Bolivia and the provision of resources for effective park patrols. The project has been incorporated into the Noel Kempff Mercado National Park, doubling the size of the protected zone. The project also promotes sustainable economic development in nearby communities to offset the unavailability of the protected land for logging and agriculture. The project conducts rigorous monitoring and verification of carbon storage through an independent contractor. **Dow Chemical** (www.dow.com) signed a contract to capture and use landfill methane at its Dalton, GA, polyurethane, latex and polystyrene manufacturing plant. Landfill gas, a natural by-product of bacteria decomposing the organic materials contained in landfills, can be used to generate steam for general manufacturing purposes. Dow will take approximately 240 billion BTU per year of landfill gas from a county-owned landfill and use it in place of natural gas. This amount of energy is equivalent to the same amount of electricity used in approximately 2,100 average U.S. homes annually. **Chevron** (www.chevron.com) supports a forestry project called "Lower Mississippi River Valley Reforestation Pilot Project" in Louisiana. Chevron planted 450,000 seedlings of 21 species of trees native to the area on 1,500 acres of land. Chevron cooperated with Environmental Synergy Inc., which carried out the tree plantings. The trees are located within the Tensas National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service. **Office Depot** (www.officedepot.com) is committed to continually seeking ways to reduce environmental impact and energy costs through sensible GHG mitigation strategies, which include four main components of energy efficiency, green design, renewable energy credits and fuel-efficient transportation. Office Depot has retrofitted stores and warehouses, including one of the largest T-5 lighting retrofit programs in the U.S. and upgrades of older heating, ventilation

	and air conditioning (HVAC) units throughout the chain. The company has Incorporated energy efficiency design components into new store and warehouse design, including piloting the use of cool roof technologies and day-lighting in new facility construction as well as planning to pilot SolarSave (tm) cool roof membrane technology in older buildings. Office Depot purchased 76,000 megawatts of renewable energy in 2006, equivalent to over 12 percent of the company's North American electricity use for the year. As of mid-2006, Office Depot was the only office products company with membership in the U.S. Environmental Protection Agency's (EPA's) Smartway Transportation Partnership, and has committed through this partnership to lowering the greenhouse gas emissions in its fleet, encouraging third-party carriers to join Smartway and asking them to commit to their own greenhouse Gas (GHG) reductions.
Program Reports and Other Links	Every Sector, One RESOLVE: A Progress Report on Business Roundtable's Climate RESOLVE Program (September 2004): http://www.businessroundtable.org/pdf/ClimateRESOLVE/2004CRAnnualReport.pdf) Business Roundtable learning sessions on GHG management: http://www.businessroundtable.org/TaskForces/TaskForce/crdocument.aspx?qs=6925BF159FF49514481138A77BE7A7A19BB6487B9693AB8 Climate RESOLVE workshops and presentations: http://www.businessroundtable.org/TaskForces/TaskForce/crdocument.aspx?qs=6915BF159FF49514481138A77BE7A7A19BB6487B9693AB9 Roundtable Guide for service companies: RESOLVE to Improve Energy Efficiency in Office Buildings: http://www.businessroundtable.com/pdf/ClimateRESOLVE/energypaper_final.pdf Business Roundtable Step-by-Step Web Tool to GHG Management: http://www.businessroundtable.org/TaskForces/TaskForce/crdocument.aspx?qs=6895BF159FF49514481138A77BE7A7A19BB6487B96A3AB0

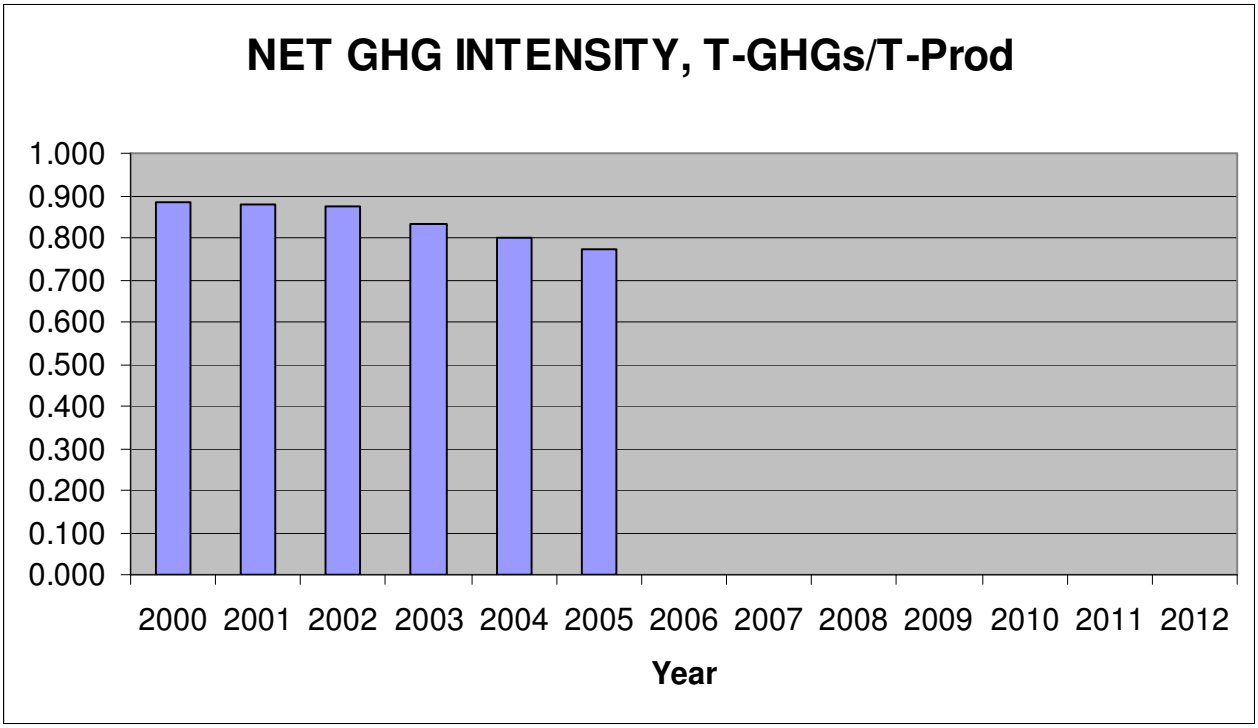
Industrial Minerals Association – North America

Highlights	Companies that participated in IMA-NA's greenhouse gas program thus far have reduced their energy-related carbon dioxide (CO_2) emissions by an average of 15.3%, through 2005.
Industry Sector and Participants	The Industrial Minerals Association - North America (IMA-NA) is a trade association created to advance the interests of North American companies that mine and/or process minerals used throughout the manufacturing and agricultural industries. Member companies produce ball clay, bentonite, borates, calcium carbonate, feldspar, industrial sand, mica, soda ash, talc, and wollastonite, as well as higher value-added products derived from these minerals. The companies included in IMA-NA's membership represent - in percentage of U.S. total production - some 80% of soda ash, and 100% of borates.
Primary CV commitment	In response to the President's challenge, IMA-NA's soda ash and borates members[1] set a goal to reduce overall greenhouse gas (GHG) emission intensity from fuel combustion per ton of product by 4.2% between 2000 and 2012. A variety of strategies are being employed to achieve this goal, including (but not limited to) improved energy efficiency through physical modifications to plant operations; use of alternative fuels; carbon sinks; sequestration; and offsets. Because this is an aggregate goal, individual company intensity goals vary depending on their unique circumstances. [1] FMC Corporation, General Chemical Industrial Products, Inc. (including its Amherstburg, Ontario plant), Searles Valley Minerals, Solvay Chemicals, and Rio Tinto Minerals

Additional CV Commitments	Additional IMA-NA ClimateVISION commitments include the following: • Our initial inventory data collection has spanned the year from 2000 to 2005; IMA-NA will collect and report data for subsequent years on an annual basis through 2012. • We will track our progress on reducing GHG intensity and publish our performance on the public section of the IMA-NA Web Site. • Beginning in 2007, we will provide annual reports on progress to the DOE (including any difficulties, special issues that are encountered, and suggestions on how the program might be improved). • IMA-NA will work with the Department of Energy (DOE) to assure that the definitions and methodologies used under guidelines established under the Energy Information Administration's (EIA) Voluntary Reporting of Greenhouse Gases program to inventory emissions, determine reductions and account for sequestration activities are accurate and consistent. • We will ensure that the IMA-NA GHG Inventory Protocol maintains consistency with the EIA Voluntary Reporting guidelines and encourage all the member companies of the IMA-NA to utilize the IMA-NA protocol. • We will support efforts by the Administration to provide appropriate recognition to businesses and industries for voluntary actions to sequester, prevent or reduce GHG emissions. • We will identify, on a company by company basis, cost-effective methods of conserving energy and improvement of the energy efficiency of our processes, and seek to improve on a continuous basis the efficiency of our energy and power generation systems. • Members will seek assistance from and work with the DOE as appropriate to meet their objectives. • Beginning in 2007, we will initiate planning to conduct sessions on energy conservation and GHG reduction at IMA-NA Workshops including, where appropriate, DOE participation. • We will implement a program to recognize outstanding GHG reduction results among members, and in the 1st quarter of 2007, will describe the program to DOE. • We will encourage IMA-NA member companies to conduct site-wide energy assessments, and promote conservation across the entire IMA-NA membership. • In the 1st quarter of 2007, we will arrange to communicate to IMA-NA members relevant DOE Best Practices by means of a link on the IMA-NA website to these practices. • In 2006 we will begin to publish energy and GHG updates in the IMA-NA Newsletter [completed]. • IMA-NA and its member companies will work to promote policies that encourage energy-efficient, low GHG technologies including combined heat and power systems (CHPs).

	• IMA-NA will promote and support activities to further our industry's understanding of the benefits of GHG intensity reductions. • We will encourage companies in the industrial minerals industry that are not IMA-NA members to participate in voluntary efforts, such as ClimateVISION, or make their own commitments. • We will seek innovative ways to offset energy-related emissions through sequestration or elimination of GHG releases not related to energy utilization. • IMA-NA will seek cross-sector alliances and facilitate information-sharing with industries with similar GHG reduction challenges. • IMA-NA will work with DOE as appropriate to develop credible methods to estimate GHG intensity improvements that result from the use of our products by our customers. • We will foster awareness and encourage IMA-NA member companies to participate in the DOE's Regional Sequestration Partnerships program. • In 2007, IMA-NA also will seek partnerships with universities to develop innovative technologies in industrial minerals, including energy conservation and reduction of GHGs. IMA-NA has begun this process by contacting some 59 leading schools and universities to explore with them their possible membership in IMA-NA.
Related Industry Programs	IMA-NA has monitored programs in which a number of its members participate, including the California Registry, Business Roundtable (among others), to learn effective measures that might be adapted to the IMA-NA program.
Industry Actions taken	In January, 2007 IMA-NA made its workplan available to DOE staff. IMA-NA is planning a session at its 2007 Fall Meeting that will focus on case studies of successful actions and strategies to reduce greenhouse gas emissions, emerging technologies, and other information exchange.
Metrics Identified	IMA-NA published its greenhouse gases inventory protocol on May 19, 2004, marking a critical first step to assure that we generate complete, reliable and valid data. The IMA-NA Greenhouse Gas Inventory Protocol was designed to assure that the greenhouse gas inventory developed by this industry sector conforms to the guidelines outlined in "The Greenhouse Gas Protocol," published jointly by the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI).
Measured Results to Date	IMA-NA now has inventory results from 2000 through 2005. They show a reduction of greenhouse gas intensity over that period of 15.3%, compared with the IMA-NA target reduction of 4.2% for the period 2000–2012. This reduction was achieved despite a widespread transition to coal energy from natural gas, necessitated by the dramatic increase in the cost of natural gas.
Company projects and	TBA

activities	
Program Reports and Other Links	ClimateVISION Minerals Web Page: http://climatevision.gov/sectors/minerals/ IMA-NA Sustainable Development Web Page: http://ima-na.org/about_ima_na/SDstorehouse.asp



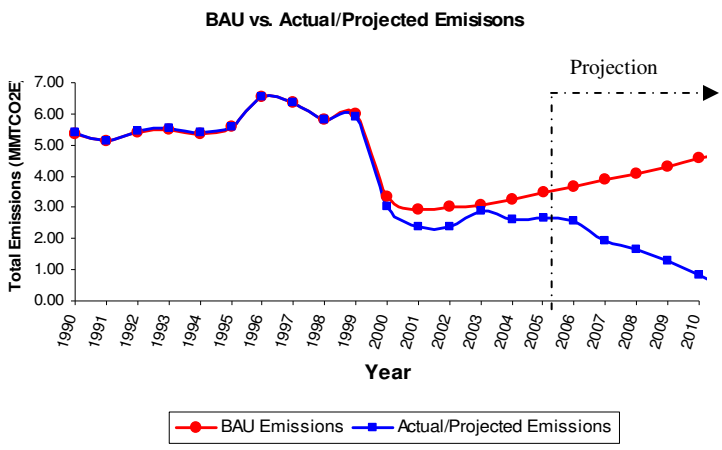
Draft Template for Reporting of Individual CV Industries (each industry would draft 2-4 pages)

Highlights	***[List the 2-4 "key accomplishments" as you see them. This is done so that key points you wish to make are more prominent and not buried too deeply in the report. These will probably relate more to the industry than to specific companies.]***

- In 2005, the Environmental Protection Agency's (EPA) magnesium industry partners reduced direct emissions of the strongest greenhouse gas, sulfur hexafluoride (SF_6), by 0.8 million metric tons of carbon dioxide equivalent ($MMTCO_2$-eq).
- EPA, the International Magnesium Association (IMA), Japan Magnesium Association (JMA), and China Magnesium Association (CMA) worked together to publish a technical brochure titled, Alternatives to SF_6 for Magnesium Melt Protection. The brochure is available in English, Japanese, and Chinese language versions at EPA's partnership web site: http://epa.gov/magnesium-sf6/resources.html.
- EPA and Lunt Manufacturing, a magnesium die casting Partner Company, conducted industrial scale trials with promising, climate friendly magnesium melt protection technologies. The study also characterized gaseous byproduct formation and monitored for workplace exposure hazards. The preliminary results from the study were presented at EPA's 4th International Conference on SF_6 and the Environment held November 28 – 30, 2006 in San Antonio, Texas. The proceedings from the conference, including a presentation of the study's preliminary results are available at: http://www.epa.gov/highgwp/electricpower-sf6/conf/agenda_06.html.

Caption: Magnesium Melt Protection Study with Lunt Manufacturing. In the foreground: Holger Brandt, President, Lunt Manufacturing, Scott Bartos, Program Manager, EPA, and Jeremy Scharfenberg, Consultant, ICF International.

Industry Sector and Participants	Climate VISION's magnesium sector participants include the members of EPA's SF_6 Emission Reduction Partnership for the Magnesium Industry and the International Magnesium Association (IMA). EPA's partnership currently includes fourteen companies representing approximately 90 percent of U.S. magnesium casting and recycling operations and 100 percent of domestic primary magnesium production. The IMA represents the global magnesium industry. Its membership spans 34 countries and is comprised of companies which are producers of primary & alloy magnesium, recyclers, users of magnesium in product manufacturing (die & sand casters, extruders, & sheet forming, etc.) and also academia as well as suppliers to the industry.
Primary CV commitment	EPA's partners are joined by the IMA in their goal to completely eliminate SF_6 emissions by year end 2010.
Additional CV Commitments	
Related Industry Programs	
Industry Actions taken	***[Think of this section as industry-wide activities you want to discuss. It (probably) differs from the section on "Company Projects and Activities" in that this is meant to be more at the level of associations or groups of companies, while the other is more company-specific.]*** IMA and EPA have organized and led two Magnesium Melt Protection Users Group Workshops in conjunction with the IMA's Annual Magnesium World Conferences; Berlin in 2005 and Beijing in 2006. The purpose of these workshops is to advance climate protection via an open exchange of industry experiences and technical information related to new melt protection technologies. The 2006 workshop featured more than 50 industry and government experts from around the world sharing strategies on eliminating SF_6 emissions. A third workshop is scheduled to be held at IMA's annual conference in Vancouver, Canada on May 13, 2007.

	 Caption: 2006 Magnesium Melt Protection Users Group Workshop, Beijing, China. IMA cosponsored EPA's 4th International Conference on SF_6 and the Environment held November 28 – 30, 2006 in San Antonio, TX. This meeting featured a two-day magnesium industry track to discuss relevant international policy and technical approaches for eliminating SF_6 emissions. The conference proceedings are available at www.epa.gov/magnesium-sf6.
Metrics Identified	The magnesium industry participants (i.e., EPA partners and IMA) are measuring their progress for Climate VISION by tracking and reporting the mass of SF_6 emissions consistent with IPCC guidance. In addition, EPA's partners track and report a normalized emissions metric based on the amount of magnesium produced or melted in given year – kg SF_6 used / metric ton of magnesium processed. The SF_6 intensity (usage rate) metric is valuable for individual companies to track their own year to year progress.
Measured Results to Date	

	Caption: EPA's U.S. Magnesium Industry Partner Achievements – Business as Usual (BAU) v. Actual and Projected SF_6 Emissions. ***[If available, charts or graphs would be particularly useful here, showing annual trends in intensity, emissions, and/or output, and showing the 2012 intensity target as well.]***
Company projects and activities	***[Think of this section as "success stories" you want to communicate. It (probably) differs from the section on "Industry Actions Taken" in that this is meant to be more company-specific, while the other is more industry-wide.]*** Chicago White Metal Casting conducted the first of its kind cover gas leak detection study using an advanced laser imaging system tuned to identify SF_6 losses. Two of EPA's magnesium die casting partners, Intermet and Lunt Manufacturing, have conducted industrial scale trials and byproduct characterization projects to support the achievement of Climate VISION's goal.
Program Reports and Other Links	***[This section is a gateway for more in-depth information on industry-wide initiatives, association home pages, progress reports, etc.]*** Climate VISION Magnesium industry web page: http://climatevision.gov/sectors/magnesium/index.html. EPA's SF_6 Emission Reduction Partnership for the Magnesium Industry home page: http://epa.gov/magnesium-sf6/. Founded in 1943, the mission of the International Magnesium Association (IMA) is to promote the use of the metal magnesium in material selection and encourage innovative applications of the versatile metal. IMA's home page: http://www.intlmag.org/index.html.

Lime

Highlights	Between 2002 and 2005, the energy-related CO_2 intensity of lime products produced by National Lime Association (NLA) member companies has been reduced by an aggregate 1.3%. During the last two years, approximately 6% of the U.S. lime production capacity was decommissioned, and replaced with new, energy-efficient equipment. On average, the energy-related, CO_2 intensity of lime from the new equipment is 35% lower than from the retired equipment. Furthermore, several companies have made great strides in increasing the recycling of lime byproducts. Industry-wide, the quantity of lime byproducts recycled has increased by more than 300,000 tons since the start of the program. From 2004 to 2005 alone, byproduct recycling as a percent of generation increased by 3½ % (or the quantity recycled increased by nearly 5%). As more byproducts are reused or sold as product, the total amount of energy used per ton of usable product is reduced, and thus intensity is reduced.
Industry Sector and Participants	NLA is the trade association for manufacturers of high calcium quicklime, dolomitic quicklime, and hydrated lime, collectively referred to as "lime." The members of NLA manufacture approximately 95% of commercial lime produced in the United States. Nearly half of the companies are small businesses, and many have no operations other than lime production.
Primary CV commitment	In answer to the President's call, the members of NLA have established a goal of reducing the intensity of carbon dioxide emissions from energy use in the lime industry. NLA members will pursue this goal by, on an aggregate basis, reducing CO_2 emissions from fuel combustion per ton of product by 8% between 2002 and 2012. Strategies include (but are not limited to) physical modifications to kilns to improve energy efficiency, operational changes, increased reuse of byproducts, use of alternative fuels, use of green power, carbon sinks and sequestration, transferable credits if available, and offsets.
Additional CV Commitments	NLA will identify research projects that could lead to further improvements in energy efficiency and other means of reducing CO_2 intensity, such as waste heat recovery and byproduct reuse, and will seek to cooperatively fund such projects with government agencies and other entities. NLA will also provide support and education for its members in their efforts to achieve its goals, through meetings, publications, and other methods.
Industry Actions taken	In the fall of 2003, NLA developed a protocol for quantifying CO_2 emissions and emission reductions from lime manufacturing plants, and began collecting data for 2002. Collection and analysis of both the 2002 and 2003 data were completed in 2004. In July of 2004, NLA submitted a report to DOE on aggregate industry trends in greenhouse gas intensity (emissions per unit of production). The second report was submitted in July of 2006. NLA Fall 2006 Operating Meeting & Professional Development Seminar focused on energy management and CO2 intensity improvement. The Professional Development session on Energy Management was led by a management consultant, and included strategies for energy efficiency

<table>
<tr><td></td><td>improvements, energy assessment and cost control. The Plenary Session of the Operating Meeting included presentations and workshops on technological approaches to increase energy efficiency, including recovery of waste heat, better measurements, and improved management of kiln operations to improve energy utilization. Strategies to increase the recycling of lime kiln dust were also addressed.

NLA's Fall 2004 Operating Meeting & Professional Development Seminar addressed energy management and combustion optimization.</td></tr>
<tr><td>Metrics Identified</td><td>The National Lime Association's "CO2 Emissions Calculation Protocol for the Lime Industry" is designed to allow the lime industry to achieve consistency, comparability and transparency in accounting for CO_2 emissions and reductions, and to ensure that technically supported emission factors and other standards are used. The Protocol was last revised on February 2, 2005, and is available here.

In developing the protocol, NLA used previous international protocols as a starting point, but added refinements to aid in more accurately estimating CO_2 emissions from lime plants. For example, NLA's protocol includes CO_2 generated from the production of byproducts, encourages the use of measured values of oxide content in lime products rather than default values, and includes detailed instructions on how to properly calculate CaO content in lime. DOE has adopted the principal elements of NLA's protocol in its final 1605(b) Technical Guidelines.</td></tr>
<tr><td>Measured Results to Date</td><td>Between 2002 and 2005, the energy-related CO_2 intensity of lime products produced by National Lime Association member companies has been reduced by an aggregate 1.3%. This shows significant progress in the last two years, (as intensity was essentially unchanged between 2002 and 2003), as reflected in the chart below:

<table>
<tr><th>Year</th><th>Energy-Related Emissions of CO_2 (million tons)</th><th>Product Produced (million tons)</th><th>Emissions Intensity from Energy Use (Energy-Related CO_2 tons per ton of product)</th></tr>
<tr><td>2002</td><td>12.9</td><td>19.1</td><td>0.68</td></tr>
<tr><td>2003</td><td>13.7</td><td>20.2</td><td>0.68</td></tr>
<tr><td>2004</td><td>14.6</td><td>21.5</td><td>0.68</td></tr>
<tr><td>2005</td><td>14.4</td><td>21.6</td><td>0.67</td></tr>
</table>
</td></tr>
<tr><td>Company projects and activities</td><td>The improvement in energy-related CO_2 intensity is the result of decisive actions taken by lime companies. Although many efforts contributed to the result, the largest reductions in intensity came as a result of (1) replacement of inefficient production capacity with more efficient capacity and (2) an increase in the recycling of lime byproducts.

During the last two years, approximately 6% of the U.S. lime production capacity was decommissioned, and replaced with new, energy-efficient equipment. On average, the energy-related, CO_2 intensity of lime from the new equipment is 35% lower than from the retired equipment. These changes required substantial capital expenditures by the lime industry.

Furthermore, several companies have made great strides in increasing the</td></tr>
</table>

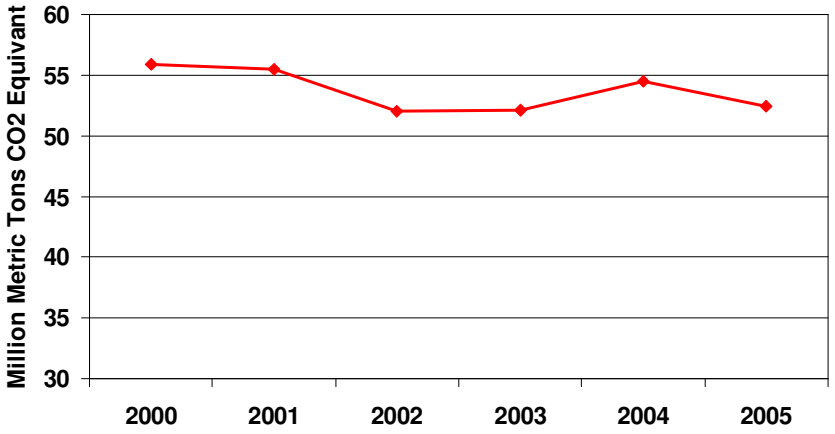
	recycling of lime byproducts. Industry-wide, the quantity of lime byproducts recycled has increased by more than 300,000 tons since the start of the program. From 2004 to 2005 alone, byproduct recycling as a percent of generation increased by 3½ % (or the quantity recycled increased by nearly 5%). As more byproducts are reused or sold as product, the total amount of energy used per ton of usable product is reduced, and thus intensity is reduced. Several companies have improved byproduct recycling or the energy efficiency of their kilns to such an extent that they have already met their share of the aggregate industry commitment for 2012. For the next reporting period (2006-07), several projects are already underway which should further contribute to the lime industry meeting it ClimateVISION goal. By example, permits for six new lime kilns have been issued in recent years that have the collective capacity to produce annually more than 2.4 million tons of lime that was not reflected in the 2004-05 report. These new kilns are expected to be 25% more energy efficient than the current industry average. Companies have also initiated studies of waste heat recovery projects, and one company has already made plans to include waste heat recovery in a kiln project to be completed in the next two years.
Program Reports and Other Links	NLA's commitment letter, progress reports, work plan, emissions calculation protocol, and other information are available at http://climatevision.gov/sectors/lime/.

Mining

Highlights	The mining industry has and will continue to participate in development and commercialization of advanced technologies that improve efficiency of mining operations and processing and use of coal and metals and minerals. Use of these technologies as well as development and use of advanced technologies that advance the capture, recovery and use of coal mine methane and improvement in carbon sequestration opportunities associated with reclamation of mined lands will result in continued reduction of greenhouse gas emissions associated with mining.
Industry Sector and Participants	The National Mining Association (NMA) represents the nation's leading companies engaged in the production of America's coal, metals, industrial and agricultural minerals; companies that manufacture mining and mineral processing machinery, equipment and supplies and other organizations that support our nation's mining industry. NMA represents over 80 percent of an $80 billion industry that provides the coal-based energy and basic metals and minerals that are essential to the economy of our nation. The members of the National Mining Association are committed to the production and use of coal, metals and minerals in a safe, efficient and environmentally responsible manner.
Primary CV Commitment	National Mining Association members committed to increasing the energy efficiency of production (and where applicable) processing operations, with the goal of obtaining a 10 percent increase in efficiency in systems that can be optimized with the processes and techniques developed by the Department of Energy (DOE) and made available to the industry through a series of jointly sponsored government industry workshops. NMA members also committed to maintain and improve progress made in reduction of methane emissions from coal mines, wherever economically and technically possible.
Additional CV Commitments	The industry committed to maximize industry participation in the Mining Industry of the Future research program (a program eliminated by DOE in 2006) with an emphasis on projects that would increase efficiency and thus reduce carbon emissions intensity of operations. The industry also committed to work with the Department of Interior (DOI) in an effort to increase the amount of carbon sequestered on reclaimed mine lands. NMA members are working collectively and in partnership with DOE, other government agencies and other industries in research programs intended to accelerate development and use

	of advanced technologies that will reduce greenhouse gas emissions intensity of both production and use of coal, metals and minerals.
Related Industry Programs	The coal industry is working with related industries to identify and advance technologies that will allow the increase in coal use with a simultaneous reduction in carbon emissions and emissions intensity. Specific programs include the DOE's Clean Coal Power Initiative and the FutureGen Alliance. NMA and its member companies have joined with DOI's Office of Surface Management (OSM) and seven Appalachian states in the Appalachian Regional Initiative to reforest mined and abandoned mine lands resulting in greater level of carbon sequestration on these lands.
Industry Actions Taken	Efficiency gains: NMA sponsored energy efficiency workshops in conjunction with the Department of Energy, worked with DOE to identify areas where research is needed to improve the efficiency of operations and, until the program was eliminated, expanded participation in the DOE Mining Industry of the Future research program. Results of this research have been made available to the industry through MINEXpo® and in other mining forums and seminars. Methane Recovery: Several NMA members have been actively involved in research programs designed to enhance coal mine methane recovery and ventilation air methane capture. NMA members that are involved in methane recovery are active participants in all aspects of the Environmental Protection Agency's (EPA) Coal Mine Methane outreach program as well as in the international Methane to Markets programs. Reclamation and sequestration: The industry formed a special industry task force with the Office of Surface Mining to work collectively to improve regulatory policies leading to more efficient reclamation with increased opportunities for carbon sequestration. Over 2,240,000 acres of abandoned mine lands have been reclaimed, a number that is increasing annually though participation in federal and state programs. NMA members are active participants or are supporting each of the seven DOE-sponsored Regional Carbon Sequestration partnerships. NMA members are participants in the Asia Pacific Partnership on Clean Development and Climate Change and specifically in the Coal Mine Task Force (CMTF). The CMTF has developed a work plan to facilitate both information exchange and technology transfer between the six APP members in the areas of coal mine

	health and safety, methane capture and reduction, coal beneficiation and reclamation. All the projects will lead to lower rates of greenhouse gas emissions associated with coal mining.
Company Projects and Activities	Most individual NMA members have specific projects and activities that are designed to increase efficiencies in mining operations, thus reducing emissions and emissions intensity associated with mining and processing. Examples of these activities can be found on individual company web sites and/or are included in individual environmental reports or publications. The types of projects include: involvement in developing and construction of advanced clean coal electric generating facilities; developing and construction of advanced coal to liquids plants that include carbon capture and sequestration; expansion of capture and sequestration of carbon on reclaimed lands including expansion of tree planting programs; involvement in carbon capture and storage research projects; involvement in the Regional Carbon Sequestration partnerships; development and use of technologies to improve the efficiency of mining operations; involvement in research projects to demonstrate advanced coal mine methane capture technology. Companies that have information on their web sites include but are not limited to: Peabody Energy (www.peabodyenergy.com), Consol Energy (www.consolenergy.com), Arch Coal (www.archcoal.com), Foundation Coal (www.foundationcoal.com), RioTinto (www.riotinto.com); Newmont Mining (www.newmont.com), Freeport McMoran Copper and Gold (www.fmx.com)
Metrics Identified and Results to Date	Metrics to measure emissions intensity from mining operations would vary by type of product but the most common would be emissions of greenhouse gases per unit of output, e.g. per ton of coal, pound of copper or ounce of gold. Unfortunately, with the exception of emissions of methane from coal mines, there are no public data available to measure emissions from mining operations in the United States. Mining is not included as a separate item in either the Energy Information Administration (EIA) estimates of U.S. greenhouse gas emissions or, with the exception of methane, in the inventory prepared by the U.S. Environmental Protection Agency. Mining is not included in the Manufacturing Energy Consumption Surveys (MECS) conducted by the U.S. Department of Energy, and information available from industry surveys conducted by the U.S. Census is extremely limited and dated. While an indication of the increase in efficiency of mining operations can be found in productivity increases (an overall improvement of seven percent since 2001) even rough estimations of energy used or emissions per unit of product output are not possible given the data available. As shown below, methane emissions from coal mines have

	declined from 55.9 million metric tons of CO2 equivalent in 2000 to 52.4 million metric tons CO2 equivalent in 2005 according to the EPA's Annual Inventory of U.S. Greenhouse Gas Emissions. The Decline in Methane Emissions From Coal Mines  Source: Annual Inventory of U.S. Greenhouse Gas Emissions, EPA
Program Reports and Other Links	National Mining Association www.nma.org

Draft Template for Reporting of Individual CV Industries (each industry would draft 3-4 pages)

Highlights	Current data indicates that U.S. cement manufacturers are on the threshold of achieving the voluntary goal set in 2001—more that 14 years ahead of schedule for a ten percent reduction in CO_2 emissions per ton of cementitious product produced or sold from a 1990 baseline by 2020
Industry Sector and Participants	The Portland Cement Association and its members participating in the CV represent 96% of production in the United States.
Primary CV commitment	In 2001, PCA members established the following voluntary goal: A ten percent reduction in CO_2 emissions per ton of cementitious product produced or sold from a 1990 baseline by 2020. The industry is now implementing a three part program to achieve the goal—and to foster additional reductions by users of the product—as described below. The reduction goal will be achieved by changes in the cement manufacturing process and in product formulation. In addition, applications of cement and concrete can result in energy savings that will further reduce overall global greenhouse gas emissions.
Additional CV Commitments	The industry is working to reduce emissions through increased energy efficiency and decreased fuel use. PCA anticipates that approximately half of the projected reductions will come from these activities. • Efficiency technologies: The industry continues to take advantage of new technologies such as conversion to modern preheater/precalciner kilns, highly energy efficient fan systems, and other means of reducing energy use per unit of output. • Alternative fuels and raw materials: We continue to utilize alternatives to conventional fuels and raw materials to reduce greenhouse gas and other pollutant emissions all the while attending to the goal of reducing the amount of energy required to produce a ton of cement. • Demand-side energy management: We have reduced the amount of electricity used to produce a ton of cement through the application of improved energy management practices and

	more efficient technologies such as fans, motors, and other items utilized in making cement. While member companies and PCA will track these emission reductions, they will not be counted toward the goal. The industry also continues to research long-term cement technology alternatives and contribute to research that could identify or develop emission-reductions technologies or options that are not currently envisioned.
Related Industry Programs	PCA and/or its member companies have been and continue to be active in international and domestic efforts to measure and reduce greenhouse gases, such as the following: 5 • The EPA Climate Wise program • The EPA Climate Leaders program • The EPA Energy Star program • The Department of Energy 1605(b) Greenhouse Gas Reporting program • The World Resources Institute/WBCSD GHG Protocol • The Pew Center on Global Climate Change • The World Wildlife Federation Climate Savers program • The World Business Council for Sustainable Development (WBCSD) report on a sustainable cement industry.
Industry Actions taken	Prepare Cement Industry Emissions Protocol: The industry has developed a comprehensive and consistent means of measuring greenhouse gas emissions that result from the production of cement. The GHG Protocol—developed under the auspices of the World Resources Institute and the World Business Council for Sustainable Development—includes a comprehensive measurement protocol for cement manufacturing emissions. PCA and some of its member companies were involved in the development of this protocol, and the Association endorses the protocol as a measurement and reporting tool. PCA is also assessing whether this protocol can be further enhanced with some minor adjustments or should be utilized for Climate VISION purposes as it stands. Prepare Cement Industry Emissions Profile: To the extent possible, the protocol would be back applied to develop a profile of emissions from the U.S. cement industry for the 1990 baseline. The industry continues to promote the use of concrete as a climate

	change solution based upon the following considerations. This is the area that provides the greatest promise for reductions, yet it is largely beyond the industry's control and therefore will not contribute toward implementation of the 2020 CO_2-reduction goal. • Energy-Efficient Structures: commercial and residential structures built with concrete exterior walls to enhance their energy efficiency. • Urban Heat Island Mitigation: light-colored concrete absorbs less and radiates more light energy than dark materials—whether on pavement, roofs, or other surfaces—thereby reducing radiated heat energy and thus ambient temperatures. • Vehicle Fuel Efficiency: studies indicate that because of its rigidity, concrete pavement enhances fuel efficiency of vehicles when compared to flexible pavements.
Metrics Identified	Finalize Changes to Portland Cement Standard through ASTM: The U.S. cement industry supports changes to the standard recipe for portland cement developed by the American Society for Testing and Materials (ASTM) to allow intergrinding some uncalcined limestone into the finished product to reduce the proportion of clinker in the finished product. Acceptance of such a change would result in a significant reduction of CO_2 emissions per unit of cement. Harmonize ASTM and AASHTO Cement Standards: Some states use a portland cement standard developed by the American Association of State Highway Transportation Organizations, rather than the ASTM standard. After the ASTM standard is improved, the AASHTO standard should be changed to conform. Measure Extent of Clinker Factor Reduction in Cementitious Materials Produced: Further reductions in clinker content might be achieved by utilization of non-clinker cementitious materials. PCA will annually quantify the impact of this practice as part of the effort to measure progress toward implementation of the 2020 CO_2-reduction goal.
Measured Results to Date	Preliminary data indicates that U.S. cement manufacturers are on the threshold of achieving the goal set in 2001—more that 14 years ahead of schedule. When this is confirmed, the industry will consider whether to establish a more ambitious target.
Company projects and activities	California Portland reduced its greenhouse gas emissions in 2006 by 31,247 metric tons over 2005. In an effort to improve efficiency and reduce emissions, they signed a 25 year contract with a wind energy company that ensures a large portion of the power consumed at the

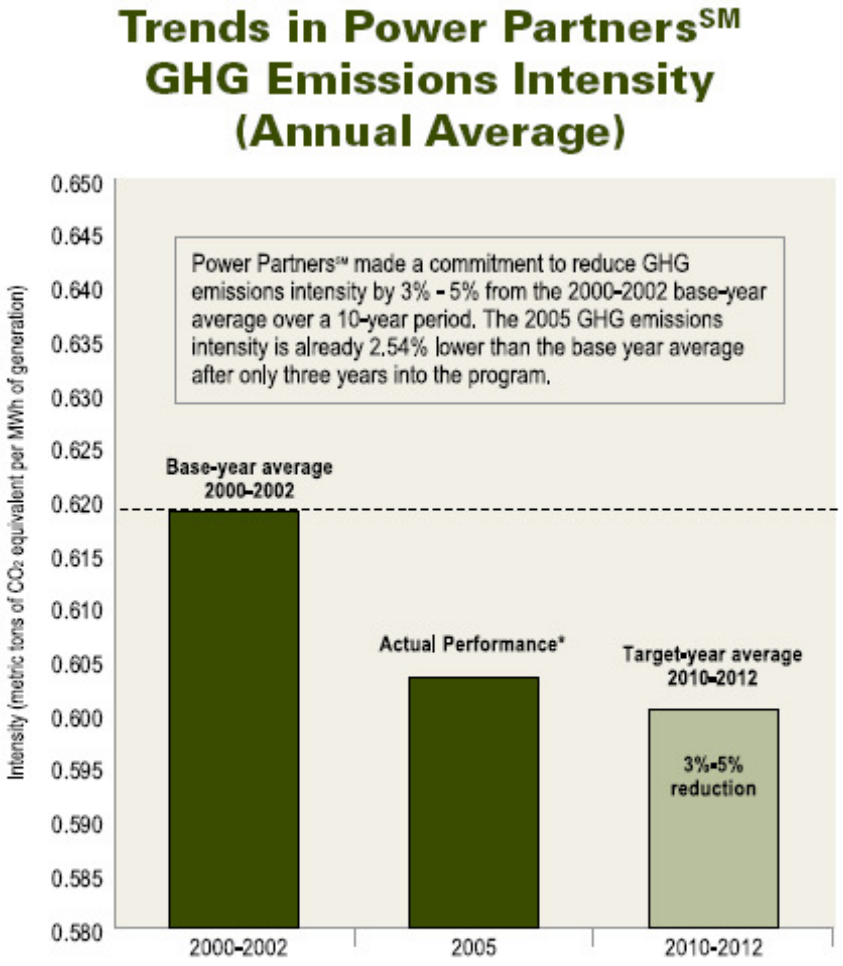
	plant will be from wind generated energy. California Portland demonstrated leadership in the promotion of energy efficiency by assuming the role of energy-efficiency ambassadors to the cement industry to encourage duplication of their efforts to save energy, emissions, and dollars. In 2006, the Mojave plant conducted energy audits to identify and quantify energy savings opportunities, set goals, and create and implement aggressive action plans. Examples of energy saving focus areas include high efficiency process improvements, electrical and lighting systems, compressed air, mechanical systems and drives, plant operations, engineering, and maintenance, and public education.
Program Reports and Other Links	PCA participated in the development of *Roadmap 2030:The U.S. Concrete Industry Technology Roadmap* in December, 2002. This document defines enabling research opportunities for cement and concrete, and proposes areas where governmental-industrial-academic partnerships can accelerate the pace of development. The carbon dioxide reduction goal and other continuous improvement targets established by PCA members are key elements of the Cement Manufacturing Sustainability program and the broader PCA Sustainable Development program. Similar efforts have since been initiated around the world, resulting in the development of a global cement industry greenhouse gas emissions protocol, prepared under the auspices of the World Business Council on Sustainable Development.

Electric Power

Highlights	In January 2003, leaders from the nation's electric power sector formed Power Partners[SM] to coordinate new voluntary commitments to substantially reduce U.S. GHG emissions intensity. The seven electric power comprising Power Partners[SM] represent 100 percent of the U.S. power generators. Power Partners[SM] made a commitment to reduce GHG emissions intensity by the equivalent of 3% to 5% from the 2000-2002 base-year average over a 10-year period. The electric power industry is currently on track to meet its reduction targets; the 2005 GHG emissions intensity is already 2.54% lower than the base-year average, after only three years into the program. The first *Power Partners[SM] Annual Report* was published in January 2007. This 52-page report documents industry-wide and individual company achievements in voluntarily reducing GHG emissions intensity. Since 2002 the Power Partners[SM] have been pursuing a series of industry-wide initiatives to assist in achieving the sector-wide carbon intensity goal: PowerTree Carbon Company, Coal Combustion Products Partnership, International Power Partnerships, and five EPRI technology initiatives – CoalFleet for Tomorrow, CO_2 Capture and Storage Test Centers, developing GHG offsets by reducing nitrous oxide emissions in agricultural crop production, promoting electric transportation, and the jointly established DOE-EPRI Center for Nuclear Fuels and Materials Research. Electric power companies are undertaking hundreds of projects to reduce GHG emissions intensity. These projects include nuclear uprate programs, biologic sequestration, renewable energy programs, green power and green pricing programs, energy-efficiency and DSM programs, SF_6 programs, clean coal technology, natural gas generation, and company-specific reduction commitments. Dozens of examples are described in the January 2007 *Power Partners[SM] Annual Report.* The *Power Partners[SM] Resource Guide* went on-line in 2005. The website, at http://uspowerpartners.org, is a Web-based resource tool developed to help electric utilities and power generators undertake actions to reduce, avoid or sequester GHG emissions. The Resource Guide helps users find the latest, state-of-the-art information on a variety of topic areas through the use of project descriptions and annotated links to other Web sites.
Industry Sector and Participants	The seven organizations comprising Power Partners[SM] represent 100 percent of the power generators in the U.S. The ***American Public Power Association (APPA)*** represents the interests of the nation's nearly 2,000 not-for-profit community- and state-owned electric utilities. The ***Large Public Power Council (LPPC)*** is an organization of 24 of the largest publicly owned electric utilities. Publicly owned electric utilities provide electric service to more than 40 million Americans. The ***Edison Electric Institute (EEI)*** is the association of U.S. shareholder-

	owned electric companies, international affiliates, and industry associates worldwide. EEI's U.S. members serve 97 percent of the ultimate customers in the shareholder-owned segment of the industry, and 71 percent of all electric utility ultimate customers in the nation. The ***Electric Power Supply Association (EPSA)*** is the national trade association that represents competitive power suppliers, including generators and marketers. The competitive sector operates a diverse portfolio of technologies that represents 40 percent of the installed generating capacity in the United States. The ***National Rural Electric Cooperative Association (NRECA)*** is the national service organization that represents the nation's 900-plus, consumer-owned electric cooperatives, which provide electric service to more than 39 million people in 47 states. The ***Nuclear Energy Institute (NEI)*** is the policy organization of the nuclear energy and technologies industry and participates in both national and global policy-making processes. NEI's objective is to ensure the formation of policies that promote the beneficial uses of nuclear energy and technologies in the United States and around the world. The ***Tennessee Valley Authority (TVA)*** is a federal corporation and the nation's largest public power company. TVA was established by Congress in 1933, primarily to reduce the risk of flood damage, improve navigation of the Tennessee River, provide electric power, and promote agricultural and industrial development in the region.
Primary CV commitment	Power Partners[SM] made a commitment to reduce the power sector's GHG intensity by the equivalent of 3-5 percent over a decade. Recognizing the effects of short-term fluctuations in weather, rainfall, and other operating conditions on generation mixes, this goal is expressed as a three-year average, using 2000-2002 as the base-year average, and 2010-2012 as the target-year average.
Additional CV Commitments	The Department of Agriculture and NRECA also signed an MOU to identify and advance technologies that will help achieve the U.S.'s 18% goal. In addition, Power Partners[SM] developed a Work Plan to implement the MOU developed with DOE, and subsequently updated the Work Plan in September 2006.
Related Industry Programs	Climate VISION aims to work with industry groups/sectors to identify and implement near-term, cost-effective GHG reduction opportunities. Power Partners[SM] and DOE are working together across a broad range of voluntary efforts and programs. These include cross-sector and intergovernmental enabling initiatives such as advanced nuclear technologies, clean coal technologies, geologic sequestration and carbon capture and storage, energy efficiency, Utility Hybrid Truck Initiative, Initiative for New Homes, and various international efforts. The Power Partners[SM] Resource Guide is a Web-based, resource tool developed to help electric utilities and power generators undertake actions to reduce, avoid or sequester GHG emissions. The Resource Guide helps users find the latest, state-of-the-art information on a variety of topic areas

	through the use of links to credible Web sites. The website, at http://uspowerpartners.org, went on-line in 2005. The Power Partners[SM] are taking actions to encourage and facilitate participation in Climate VISION by their trade association members and TVA. The important purposes of this effort will be to improve the level and depth of participation, through workshops or other means, and to enhance performance and reporting. An example of this effort is the *National Action Plan for Energy Efficiency*, summarized at http://www.epa.gov/solar/pdf/napee-factsheet.pdf. Power Partners[SM] and DOE view the development and use of more advanced energy technologies as critical to the achievement of the U.S. GHG intensity reduction goal. Power Partners[SM] and DOE agreed to work collectively to develop a process (subject to available funds and applicable provisions of law) for (i) identifying high-priority areas for power sector research, development, demonstration and deployment (RDD&D) associated with technologies that would contribute to the achievement of the national goal and ultimately would contribute to surpassing this goal, and (ii) recommending steps to carry out power sector RDD&D in the identified, high-priority areas.
Industry Actions taken	The Power Partners[SM] are developing and promoting power sector initiatives that will allow their member utilities, power generators and TVA to pool resources and collaborate collectively on joint, industry-wide programs and activities to reduce GHG emissions intensity. Since 2002 the Power Partners[SM] have been assessing and developing a series of industry-wide initiatives in support of the President's goal and to help the power sector reduce its carbon intensity. The following activities are being pursued to assist in achieving the sector-wide carbon intensity goal: PowerTree Carbon Company, Coal Combustion Products Partnership, International Power Partnerships, and five EPRI technology initiatives – CoalFleet for Tomorrow, CO_2 Capture and Storage Test Centers, developing GHG offsets by reducing nitrous oxide emissions in agricultural crop production, promoting electric transportation, and the jointly established DOE-EPRI Center for Nuclear Fuels and Materials Research.
Metrics Identified and Measured Results to Date	The power sector's primary CV commitment is expressed in terms of the ratio of CO_2 emissions to electricity generated (KWH), as adjusted ("the equivalent of 3-5 percent"). Since the federal government's raw statistics for the industry do not take into account off-system actions and other non-generation activities by the power sector that offset and affect GHG emissions from generation, Power Partners[SM] surveyed its utilities, power generators and members to obtain this information. These off-system and non-generation actions included: transmission and distribution actions, energy efficiency and DSM, carbon sequestration, coal combustion product utilization, sulfur hexafluoride (SF_6) activities and landfill methane recovery. The results of the industry's overall efforts through 2005 are shown here. The electric power industry is currently on track to meet its reduction targets. The

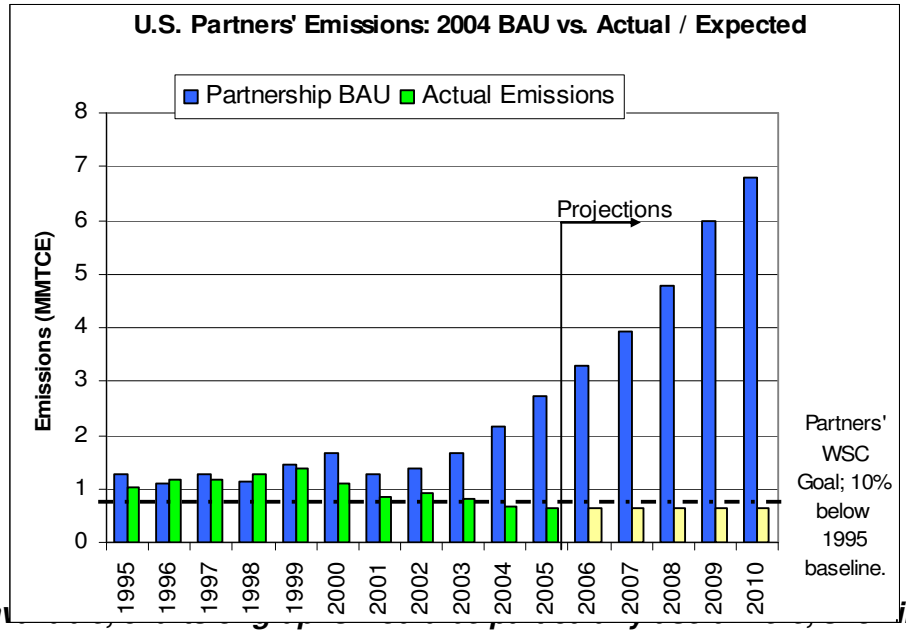
	2005 GHG emissions intensity is already 2.54% lower than the base-year average, after only three years into the program.  * Includes effect of off-system and non-generation actions offsetting and affecting GHG emissions from generation. Sources: U.S. Department of Energy, Energy Information Administration, and 2006 Power Partners℠ Survey.
Company projects and activities	Actions by utilities, power generators and TVA are the cornerstone of success for the voluntary initiative by Power Partners℠. Power Partners℠ are encouraging trade association members and TVA to undertake specific commitments, including achieving voluntary GHG intensity reduction goals, along with developing plans to implement such commitments. Activities being pursued by companies include nuclear uprate programs, biologic sequestration, renewable energy programs, green power and green pricing programs, energy-efficiency and DSM programs, SF_6 programs, clean coal technology, natural gas generation, and company-specific reduction commitments. Dozens of examples are described in the January 2007 *Power Partners℠ Annual Report*.

	These projects continue the electric power sector's long tradition of voluntary efforts to reduce GHG emissions. Since the 1994 beginning of DOE's Voluntary Reporting of Greenhouse Gases Program (§1605(b) program) electric utilities have been the dominant industry reporting, accounting for over half of all voluntary reports since the program's start. The Edison Electric Institute has analyzed the 2004 electric power company reports to EIA's 1605(b) program. On a project-by-project basis, the electric power sector reported nearly 1,500 individual projects that directly or indirectly reduced greenhouse gas emissions, both within the electric power sector as well as other sectors. On a tonnage basis, nuclear power-related projects, including increased generation and capacity improvements (power uprates), accounted for about 142 million metric tons of CO_2 reductions, about 54 percent of the sector's total project level reductions. Other major CO_2-reducing activities reported by the electric power sector include demand-side management (DSM) programs, transmission and distribution system upgrades, natural gas plant expansion projects, landfill gas recovery projects, and carbon sequestration activities.
Program Reports and Other Links	Power Partners[SM] *Annual Report* (January 2007) http://test.uspowerpartners.org/Reports&pubs/PowerPartners(sm)-AnnualReport-Jan2007.pdf Power Partners[SM] Program Description: http://www.climatevision.gov/sectors/electricpower/pdfs/power_partners.pdf Power Partners[SM] Website: http://uspowerpartners.org/ Power Partners[SM] Work Plan: http://www.climatevision.gov/sectors/electricpower/pdfs/work_plan.pdf

Draft Template for Reporting of Individual CV Industries (each industry would draft 2-4 pages)

Highlights	***[List the 2-4 "key accomplishments" as you see them. This is done so that key points you wish to make are more prominent and not buried too deeply in the report. These will probably relate more to the industry than to specific companies.]*** • In 2005 alone, the Environmental Protection Agency's (EPA) U.S. semiconductor industry partners reduced direct emissions of high global warming potential fluorinated compound (FC) gases such as perfluorocarbons, hydrofluorocarbons, sulfur hexafluoride, and nitrogen trifluoride by 7.7 million metric tons of carbon dioxide equivalent ($MMTCO_2$-eq). EPA's partners are on track to achieve and exceed its technically aggressive 2010 goal of reducing emissions 10 percent below their 1995 baseline. • The Semiconductor Industry Association (SIA), electronics industry suppliers, and EPA led the Intergovernmental Panel on Climate Change's (IPCC) effort to revise the industry's greenhouse gas reporting guidelines in 2005 and 2006. The IPCC published the revised guidance in November, 2006. • EPA and partner company, Qimonda, conducted a cooperative study of installed FC emissions abatement equipment in 2006. EPA and Qimonda plan to conduct a follow-up study in 2007 to assess the consistency of abatement device performance over time. Other partners have conducted their own emission control technology assessments in the past – the Qimonda study is the first in which EPA was an active participant. • In accordance with EPA's Partnership agreement, International SEMATECH and SIA published a milestone technical document titled, Reduction of Perfluorocompound (PFC) Emissions: 2005 State-of-the-Technology Report in December 2005. The full report is available at EPA's semiconductor partnership website: http://epa.gov/semiconductor-pfc/resources.html.
Industry Sector and Participants	EPA's PFC Reduction / Climate Partnership for the Semiconductor Industry represents approximately 80 percent of U.S. industry. EPA's initiative with U.S. manufacturers catalyzed global semiconductor industry cooperation and a commitment, embodied by the World Semiconductor Council (WSC), to reduce PFC emissions worldwide. China is world's fastest growing semiconductor production center and therefore a potential new source of PFC emissions. In 2006, China's semiconductor industry agreed to join the WSC and support the industry's cooperative climate protection efforts.

	The US semiconductor industry has been undergoing changes with a number of participant companies no longer manufacturing or no longer manufacturing in the US. The principle reason for this is the high cost of manufacturing leading edge products and keeping up with the technology changes from process generation to generation. Only the largest, most successful, companies can keep pace with the rising cost of manufacturing. Since much of the production now comes from foreign "foundries" using US product designs, the global agreements which include these foundry-based companies become increasingly significant to the industry's climate protection initiative.
Primary CV commitment	The U.S. semiconductor industry, represented by the members of EPA's PFC Reduction / Climate Partnership, has committed to reduce absolute PFC emissions by 10% below the 1995 baseline level by the year 2010.
Additional CV Commitments	
Related Industry Programs	One of EPA's earliest voluntary climate protection partnerships, the PFC Reduction / Climate Partnership for the Semiconductor Industry was launched in 1996. Guided by the principles of pollution prevention, EPA's partners are striving to aggressively reduce emissions of PFCs. Six of EPA's partners have expanded their climate protection efforts to address their firm's entire "basket" of greenhouse gas emissions by joining EPA's Climate Leaders program. The six semiconductor partners that have also joined Climate Leaders are AMD, Eastman Kodak, Fairchild Semiconductor, IBM, Intel, and ST Microelectronics.
Industry Actions taken	***[Think of this section as industry-wide activities you want to discuss. It (probably) differs from the section on "Company Projects and Activities" in that this is meant to be more at the level of associations or groups of companies, while the other is more company-specific.]*** EPA and its industry partners have developed a draft revised PFC emissions reporting format intended to improve and communicate the level of confidence and certainty associated with the partnership's data. The revised format is consistent with IPCC's 2006 guidance and may be adopted by the global industry pending approval by the WSC. SIA together with its WSC counterparts organize the International Semiconductor Environmental Safety and Health (ISESH) conference each summer. EPA supports and attends this meeting as it has become the semiconductor industry's premier venue for exchanging technical information on PFC emissions reduction in addition to addressing a broader range of industry's environmental challenges.
Metrics Identified	EPA's partners report their absolute PFC emissions data by specific process gas type annually via a designated third party to protect confidential business information. EPA conducts an on-site review of the partners' reports and uses the data to generate the Inventory of U.S. Greenhouse Gas Emissions and

	Sinks. EPA's partners currently report emissions using 2001 IPCC Tier 2 methodologies. The semiconductor industry uses and emits a variety of PFC materials during manufacturing. The emissions reporting metric used by the industry is mass of PFC gas. The exact mass of PFC gas is often converted to an equivalent mass of carbon by multiplying the amount by the 100-year global warming potential value and 12/44, the atomic mass ratio of carbon to carbon dioxide. This conversion allows a company and the industry to express its PFC emissions in terms comparable with other greenhouse gas emission sources.
Measured Results to Date	**U.S. Partners' PFC Emissions: 2004 Business as Usual (BAU) Model Scenario v. Actual / Expected Emissions**  ***[If av… …ing annual trends in intensity, emissions, and/or output, and showing the 2012 intensity target as well.]***
Company projects and activities	***[Think of this section as "success stories" you want to communicate. It (probably) differs from the section on "Industry Actions Taken" in that this is meant to be more company-specific, while the other is more industry-wide.]***
Program Reports and Other Links	***[This section is a gateway for more in-depth information on industry-wide initiatives, association home pages, progress reports, etc.]*** Climate VISION semiconductor industry web page: http://www.climatevision.gov/sectors/semiconductors/index.html EPA's PFC Reduction / Climate Partnership for the Semiconductor Industry

	web site: http://epa.gov/semiconductor-pfc/ SIA's Environment, Safety & Health web page: http://www.sia-online.org/iss_environment.cfm The World Semiconductor Council's homepage: http://www.semiconductorcouncil.org/ 2006 IPCC Guidelines on National Greenhouse Gas Inventories web site (see Chapter 6 for electronics industry emissions): http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol3.htm